THE PHONOLOGY OF SONORANTS IN BAVARIAN GERMAN

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Erin Noelliste

THE PHONOLOGY OF SONORANTS IN BAVARIAN GERMAN

In this dissertation, I investigate the phonological behavior of Bavarian German liquids, nasals, and vowels. These sounds undergo various changes, depending on the context, and I examine these changes in terms of features, which are determined via a contrastive hierarchy. This dissertation departs from traditional studies on German dialects, which are purely descriptive; the goal of this dissertation is to not only describe the facts from a particular dialect, but also to show how new data bear on theoretical issues in phonology.

In chapter 2, I focus on demographics and methods, discussing my BG subjects and giving relevant information about the region and town in which they live. I also explain methodology of data collection and analysis.

Chapter 3 presents the phonology and features of BG. I outline the underlying consonantal and vocalic segments of the dialect, providing data for contrasts and presenting distinctive features. The latter part of the chapter uses contrastive features to analyze several processes which interact with rules involving sonorant consonants.

Chapter 4 focuses on BG nasals and opaque rule interactions which involve that class of sounds. I show that opacity in some data is created with a feeding rule order, as opposed to a counterbleeding order argued in most traditional accounts of opacity. I also show how the interaction of rules concerning nasals and dorsal fricative assimilation sheds light on the feature representations of dorsal fricatives.

The focus of chapter 5 is on the liquids /l ʀ/. I give the distribution for liquids and show that in the coda, both liquids vocalize via a rule of Liquid Vocalization. I also discuss

how Liquid Vocalization interacts with other processes in this dialect, including rules from previous chapters.

In chapter 6, I discuss hiatus and its avoidance in BG, showing that BG employs several repairs for hiatus sequences, particularly Homorganic Glide Formation, Consonant Epenthesis, and Vowel Elision. I discuss BG R-Epenthesis and give data for other epenthetic consonants in BG, showing that consonant epenthesis in English and BG are not entirely the same.

In chapter 7, I summarize the dissertation and suggest directions for future research.

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CHAPTER 1

INTRODUCTION

1.1 Goals

In this dissertation, I investigate the phonological behavior of Bavarian German (BG) sonorants, defined as the liquids /l ʁ/, nasals /m n ŋ/, and vowels (including diphthongs). These sounds undergo various changes, depending on the context, and it is my goal to examine those changes. Even though much descriptive work has been done on Bavarian dialects, no study to my knowledge has examined the particular variety of Bavarian German to be specified in chapter 2; therefore, I discuss new data.

This dissertation departs from traditional studies on German dialects, which are purely descriptive (see, for example, Schmeller 1821, Schatz 1897, Kranzmayer 1956, Zehetner 1985, and Merkle 2005 for descriptive studies of Bavarian dialects similar to the one I investigate). The goal of this dissertation is not only to describe the facts from this particular dialect (which are not quite the same as the facts in the descriptive studies cited above), but also to show how the new data bear on theoretical issues in phonology. Thus, this dissertation provides analysis of BG phonological processes in a way that has not been done before.

This work is important for several reasons. First, it shows the relevance of data from the present BG dialect for current issues in phonological theory. One theory employed here is the contrastive feature hierarchy (Dresher 2009), which provides an algorithm for the assignment of distinctive features. Every speech sound (i.e. consonants and vowels) is comprised of features which distinguish it from other speech sounds. For example, the consonants /m n/ share the feature [nasal] because they are produced with air flowing through the nasal cavity. Nasal consonants are different from non-nasal consonants, such as /ʀ l/, which are produced in the oral cavity. Thus, the feature [nasal] may be contrastive for a language which has both nasals /m n/, as well as oral consonants /ʀ l/. The theory of contrastive feature hierarchies referred to above provides a systematic method for determining which features in a given language contrast; my dissertation provides a case study for this theory.

Another current issue discussed in this dissertation is opacity. Phonological opacity is the opposite of transparency: a transparent rule interaction occurs when the surface form is expected, given the phonological rules in a language. Opacity occurs when a form surfaces which is unexpected, given the phonological rules in a particular language. That is, a phonological rule appears to overapply (apply when it should not) or underapply (not apply when it should) to a given surface form. Some data in this dissertation show a type of opacity which has only recently been discovered (Baković 2007, 2011). Thus, the BG data add to a developing phonological theory.

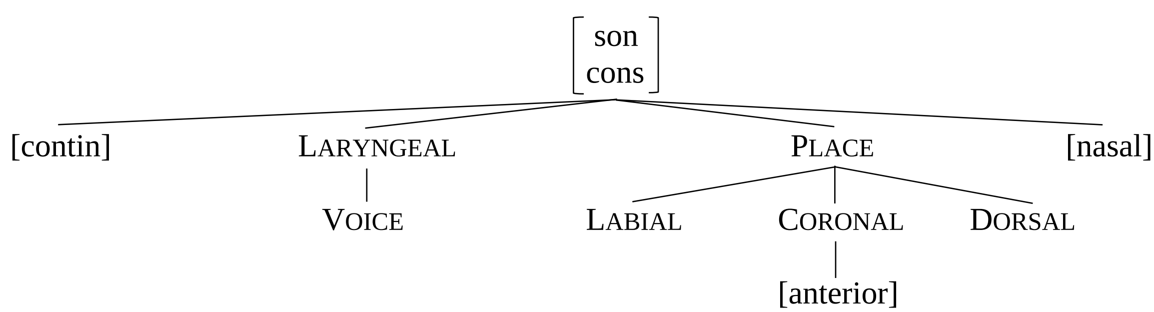
Several processes which behave uniquely in this BG variety are analyzed in this dissertation and provide support for specific phonological feature representations. For example, I give phonetic evidence and phonological argumentation which support a particular representation for the dorsal fricative [ç] proposed in the literature for other languages and for Standard German (Robinson 2001, Glover 2014). The features and analysis given here are based on the interaction of dorsal fricatives with sonorant segments in BG.

The remainder of this chapter introduces key phonological principles which will be used in later chapters to analyze BG data. Unless otherwise noted, the phonetic symbols used throughout this document are from the IPA (International Phonetic Association 1999).

1.2 Feature Geometry

I follow the model of Feature Geometry described in McCarthy 1988, where the ROOT is composed of the major class features [sonorant] and [consonantal]. These features form a feature bundle, and all other features, including place and manner features, are in a dependency relation to the features in the ROOT; this is known as a feature tree (McCarthy 1988:97; see also Clements 1985, Sagey 1986, Schein & Steriade 1986, Mester 1986, and Halle 1988). Feature trees differ from the *SPE* (*Sound Pattern of English*, Chomsky & Halle 1968) model, where all of a segment's features appear in a single unordered feature bundle. A feature tree for all of the distinctive consonantal features for BG is given in (1).

(1) Consonantal Feature Tree



Each of the features posited in this dissertation is distinctive, i.e. each distinguishes underlying sounds. For example, the feature [consonantal] distinguishes consonants from vowels, while the feature [sonorant] differentiates obstruents (stops, fricatives, affricates) from sonorants (nasals, liquids, vowels). The feature [continuant] accounts for the difference between stops and fricatives (e.g. /t/ vs. /s/), where the former are [-continuant] and the latter [+continuant] (see Halle and Clements 1983:7 for a definition). VOICE, which distinguishes obstruents such as /t/ from ones like /d/, is a daughter of LARYNGEAL (Lombardi 1991).[1] Following authors such as Lombardi (1991, 1999) and Brockhaus (1995), I assume that the feature VOICE is privative.[2] In other languages, there can be more than one distinctive laryngeal feature;[3] as BG simply has a two-way laryngeal contrast, only one distinctive feature (VOICE) is needed. BG has labial consonants such as /p/, coronal consonants like /t/, and dorsal consonants such as /k/; these motivate three contrasting place nodes: LABIAL, CORONAL, and DORSAL (Sagey 1986, Clements & Hume 1995). Some languages have a fourth articulator (PHARYNGEAL) under PLACE (McCarthy 1994), but BG does not. A further consonantal place feature is [anterior], which distinguishes sounds like /s/ (which are produced in front of the alveolar ridge) from /ʃ/ (produced behind the alveolar ridge) (Sagey 1986, McCarthy 1988, Paradis & Prunet 1991); [anterior] is a daughter of CORONAL. Finally, BG has nasal sounds like /m n ŋ/ and non-nasal sounds like /ʀ l/; these motivate the feature [nasal] (McCarthy 1988).

Some features in this dissertation are binary and thus have a '±' value (Jakobson, Fant, & Halle 1952, Chomsky & Halle 1968). Other features are privative, such as VOICE (Lombardi 1991, 1999, Brockhaus 1995), as well as LABIAL, CORONAL, and DORSAL,

[1] Features other than VOICE for distinguishing voiced and voiceless obstruents have been proposed in the literature. For example, Halle and Stevens (1971) use the features [stiff vocal chords] and [slack vocal chords] to represent voiceless and voiced sounds, respectively. Other authors, such as Iverson & Salmons (1995, 1999), Jessen & Ringen (2002), and Vaux & Samuels (2002) employ [sg] (spread glottis), whereas Jessen (1998) adopts the features [tense] and [lax], where voiceless obstruents are [tense] and voiced obstruents [lax].

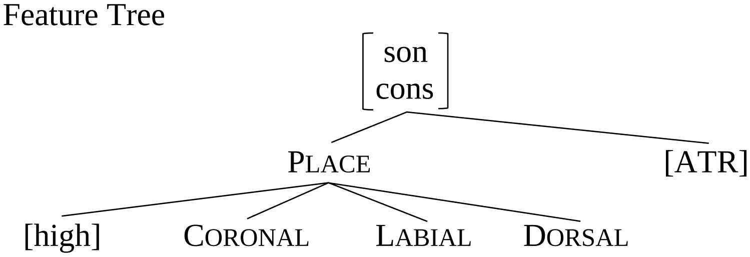
[2] Some authors, such as Wiese (1996) and Wetzels & Mascaro (2001), argue for binary [voice] features.

[3] Those additional features are necessary to capture distinctive aspiration and/or glottalization.

which are daughters of PLACE, as in the Articulator Theory (see McCarthy 1988:99 and discussion therein for the difference between Articulator Theory and Place of Articulation Theory). In feature matrices, if a privative feature is present, it is denoted with '✓'; if not present, the cell is left empty.

A feature tree for the distinctive vocalic features for BG is given in (2).

(2) Vocalic Feature Tree



BG has contrasts between front and back vowels, such as /i/ and /u/, which have been captured in multiple ways in the literature. Some authors, such as Sagey (1986), argue that all vowels are DORSAL, and the feature [back] distinguishes front from back vowels. I follow Pulleyblank (1988), Broselow & Niyondagara (1990), Lahiri & Evers (1991), Hume (1992), van de Weijer (1994:38ff), Clements & Hume (1995), and Rice (1995) in analyzing front vowels with a CORONAL node under PLACE. For such analyses in SG, see also Robinson (2001) and Glover (2014). BG back vowels are analyzed as either LABIAL or DORSAL, depending on whether or not the lips are rounded. Thus, a vowel such as /o/ is LABIAL, while /a/, which has no articulation at the lips, is DORSAL.

BG also contrasts high and mid vowels, e.g. /i/ and /e/; these contrasts motivate the feature [high]. As shown in (2), [high] is a daughter of PLACE, not of DORSAL.[4] A number

[4] Cf. Sagey (1986), who analyzes [high] as a daughter of DORSAL, since in that analysis all vowels are DORSAL.

of other phonologists have also argued that [high] is independent of DORSAL (see, for example, Lahiri & Evers 1991, Odden 1991, and Parkinson 1996).

Contrasting vowels such as /i/ and /ɪ/ motivate a feature for tenseness. I analyze vowel tenseness in terms of the feature [ATR] (Advanced Tongue Root) (see Hall 2007b:329 for discussion), where [+ATR] represents tense vowels and [-ATR] lax vowels. I consider vowels to contrast in terms of tenseness and not length. BG has long vowels, but these are derived and not underlying; see chapter 6 for discussion of derived long vowels. See also Hayes (1989) and Zec (2007) for various approaches to segmental length.

1.3 The Contrastive Feature Hierarchy

In *The Contrastive Hierarchy in Phonology*, Dresher (2009) lays out a framework for determining a language's contrastive features using feature ordering, i.e. a feature hierarchy. Under this framework, the way in which languages assign features to segments depends on sounds present in that language, e.g. /p t k/ in a language in which those sounds are the only stops are analyzed differently than /p t k/ in a language in which there are also /b d g/.

There are three central concepts of Dresher's (2009) framework, which will be presented below. The first of these concepts is the Successive Division Algorithm (SDA) (Dresher 2003, 2008), which is an algorithm for determining contrastive specifications in a language.[5] The SDA is given in (3).

[5] The SDA is based on earlier phonological works where contrastive hierarchies were employed, whether or not the hierarchy was explicitly stated. See, for example, Trubetzkoy (1939), Jakobson & Lotz (1949), Hockett (1955), Jakobson & Halle (1956), and Halle (1959).

(3) Successive Division Algorithm (Dresher 2009:16)

a. Begin with *no* feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.
b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.
c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

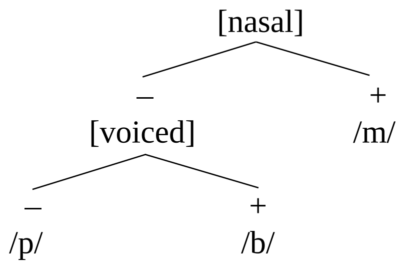
The SDA does not specify which features in a language are contrastive; this depends upon a given language's phonological behavior and the feature theory used. Note that division of features via step (3b) is not specified as being strictly binary. That is, a feature should be divided into "as many subsets as the feature allows for", which permits ternary structures in a hierarchy. Throughout the book, Dresher (2009) applies the SDA to various languages, illustrating how different feature hierarchies can account for the phonology of different languages and dialects. Dresher (2009) shows how the SDA applies to the French bilabial stops /p/, /b/, and /m/, based on analysis in Jakobson & Lotz (1949); this is given in (4).

(4) Contrastive specifications for French bilabial stops (Jakobson & Lotz 1949)

	p	b	m
[voiced]	–	+	
[nasal]	–	–	+

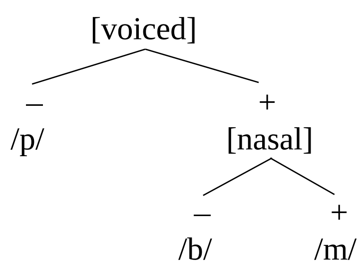
These features are determined by feature ordering (i.e. the SDA), as in (5). The first feature, [nasal], is divided into two sets, with positive '+' and negative '–' values. Because there is more than one [-nasal] member, the next feature [voiced] is divided, again in positive and negative values. Once [voiced] has been divided, each set has one member (cf. step (3c)), and the hierarchy is complete. /m/ is not specified for [voiced] because it does not have a voiced counterpart.[6]

(5) Ordering of [nasal] > [voiced] applied to /p/, /b/, and /m/ (Dresher 2009:15)



Dresher (2009) also shows how the reversal of the above feature ordering produces different distinctive features for a language; this is given in (6), where [voiced] is divided first, and then [nasal]. Feature matrices for the hierarchy in (6) are provided in (7).

(6) Ordering [voiced] > [nasal] applied to /p/, /b/, and /m/ (Dresher 2009:16)



[6] Feature hierarchy relationships as in (5) are not the same as Feature Geometry representations. That is, just because feature [F] dominates feature [G] in a hierarchy does not mean that [G] is the daughter of [F] in the feature representation.

(7) Contrastive specifications with the ordering [voiced] > [nasal] (Dresher 2009:16)

	p	b	m
[voiced]	–	+	+
[nasal]		–	+

Dresher (2009:72) writes: "A common assumption […] is that the behaviour of a phoneme is a function of its contrastive features." Therefore, the feature hierarchy which is best for a given language depends on that individual language's phonological behavior. For example, there may be a process in a language where /p b/ pattern together but not /m/; in this case, the feature ordering in (5) accounts for this behavior with the distribution of the distinctive feature [nasal]. That is, /p b/ are both [-nasal], while /m/ is [+nasal]. Therefore, the rule may be formulated to affect [-nasal] segments (/p b/) in a certain way and not the [+nasal] segment (/m/). Similarly, if a language has a process where /b m/ pattern together and not /p/, the ordering in (6) would account for this with the feature [voiced]: /b m/ are [+voiced] and [p] is [-voiced]. Thus the rule can refer to [+voiced] segments to account for the behavior of /b m/.

The framework described in Dresher (2009) does not have default rules to fill in feature specifications of segments. It is also not a theory of underspecification, and therefore, it adopts neither Radical Underspecification (Kiparsky 1982, 1985, Pulleyblank 1983, Archangeli 1984, 1988, Archangeli & Pulleyblank 1989) nor Contrastive Underspecification (Steriade 1987b, Christdas 1988).

This framework differs from an approach where segments are fully specified for all features. See, for example, the full specifications of /p/, b/, and /m/ for the features [voiced] and [nasal] in (8).

(8) Full specifications for French bilabial stops (Dresher 2009:13)

	p	b	m
[voiced]	–	+	+
[nasal]	–	–	+

Dresher (2009:73) does not claim that fully-specified feature systems such as (8) are necessarily incorrect; however, in his approach, the focus is strictly on contrast. He notes that in a fully specified system there may still be contrast; the difference is that some of the features in a system like (8) will not be contrastive (Dresher 2009:73).[7]

Another central concept in Dresher (2009) is the Contrastivist Hypothesis, which states that "only contrastive feature specifications are active in the phonology" (Dresher 2009:75). He argues that the Contrastivist Hypothesis "is crucial to the contrastive hierarchy, because the former supplies the main empirical reasons for being interested in the latter…" (Dresher 2009:250). The Contrastivist Hypothesis, as formulated by D. C. Hall (2007:20), is given in (9).

(9) The Contrastivist Hypothesis:
The phonological component of a language L operates only on those features which are necessary to distinguish the phonemes of L from one another.

This hypothesis predicts that non-distinctive features should not play a role in the phonology, and thus phonological rules should not need to refer to them. However, Dresher (2009:206-209) notes that there are a few exceptions to this, and therefore in certain cases, the Contrastivist Hypothesis is too strong. Nonetheless, Dresher (2009:209) argues that

[7] See discussion on issues of redundancy in Dresher (2009:17-19).

"the range of cases where the Contrastivist Hypothesis is upheld and contributes to illuminating analyses suggests that it is well worth maintaining and refining as a basic principle of phonological patterning." Therefore, despite certain counter-examples to (9), Dresher (2009) maintains that for most analyses, the Contrastivist Hypothesis applies.

Finally, Dresher (2009) argues for a framework called the Modified Contrastive Specification (MCS), which he explains is a combination of the Contrastivist Hypothesis and the contrastive hierarchy. MCS is developed from research conducted at the University of Toronto. Dresher (2009:163-164) describes MCS as follows:

> MCS began with a focus on complexity in phonology (Avery and Rice 1989; Dresher and Rice 1993; Dresher, Piggott and Rice 1994; Dresher and van der Hulst 1998), and evolved to concentrate on markedness and contrast. In this model, complexity in representations is driven by both contrast and markedness. Assuming that each feature has a marked and unmarked value, MCS posits that only marked features count toward complexity; thus, segments with fewer marked features are less complex than those with more marked features. MCS proposes that contrasts are determined by the SDA operating on a hierarchy of features. Since a more marked representation is permitted only if needed to establish a contrast with a less marked one, the theory of MCS leads us to expect a relation between the amount of segmental markedness a system allows and the number and nature of contrasts it has.

Dresher shows how the MCS works with data from various languages and argues that it can account for data better than other phonological frameworks.

I adopt the MCS framework discussed here in chapter 3 to determine contrastive features for BG.

1.4 Opacity

Surface forms can be either transparent or opaque, depending on the interactions of rules in a language's phonology. Opacity was originally formulated by Kiparsky (1976:79) as:

(10) Opacity:
A phonological rule **P** of the form $A \rightarrow B / C\_\_D$ is opaque if there are surface structures with either of the following characteristics:
a. instances of *A* in the environment $C\_\_D$.
b. instances of *B* derived by **P** that occur in environments other than $C\_\_D$.

(10a) is opaque because rule **P** has not applied, even though the structural description of the rule has been met. (10b), on the other hand, is opaque because rule **P** has applied, even though the structural description of the rule has not been met.

The opposite of opacity is transparency: when the rules of a language produce expected surface forms. There are two types of transparent rule interactions: feeding and bleeding. A feeding order occurs when Rule A produces an input to Rule B, whereas a bleeding order occurs when Rule A blocks Rule B from applying; that is, the first rule changes the input in such a way that the second rule cannot apply. Examples of feeding and bleeding are provided below.

Reversing these two transparent rule orderings produces opacity, as described in (10). The type of opacity in (10a) is called underapplication (McCarthy 1999) and is typically associated with a counterfeeding rule ordering (Baković 2011:43). Counterfeeding is the reverse of feeding: if Rule A feeds Rule B, but these rules are ordered with Rule B before Rule A, this is a counterfeeding relationship. (10b) exhibits overapplication (McCarthy 1999) and is traditionally affiliated with counterbleeding rule orderings (Baković 2011:43). Counterbleeding is defined as the opposite of bleeding: if Rule A bleeds Rule B, and the rules are ordered such that Rule B occurs before Rule A, this is a counterbleeding rule ordering. Below, I give examples of counterbleeding and counterfeeding orders.

The example in (11) illustrates a feeding rule interaction, where epenthesis of a vowel before the word-initial cluster (Rule A) produces the context for Rule B: epenthesis of a glottal stop before a syllable-initial vowel. Thus, Rule A feeds rule B.

(11) Feeding in Classical Arabic (from McCarthy 2007:103)

Underlying		/dˁrib/	'beat! (M. SG.)'
Rule A	Ø → V / __#CC	idˁrib	
Rule B	Ø → [ʔ] / __$_{\sigma}$[V	ʔidˁrib	
Phonetic		[ʔidˁrib]	

An example of a bleeding rule interaction in the Native American language Karok (described in Bright 1957) is given in (12). This derivation shows that when /i/ is deleted via Rule A, it bleeds Rule B because [i] is part of the context for Rule B.

(12) Bleeding in Karok (from Kenstowicz 1994:97)

Underlying		/ʔu-iskak/	'jump (3. SG)'
Rule A	V → Ø / V __	ʔu-skak	
Rule B	[s] → [š] / [i] (C) __	-----	
Phonetic		[ʔu-skak]	

As stated above, when transparent rule interactions are reversed, opacity is the result. For example, if we were to take the feeding example in (11) and reverse the ordering of Rules A and B, this would be a counterfeeding interaction, as shown in (13).[8] In this example, Rule B underapplies because it is ordered before Rule A, which creates the structural description for Rule B (Rule A inserts the word-initial vowel which is the context for glottal stop epenthesis, i.e. Rule B). Thus, the hypothetical surface form with a word-initial vowel does not undergo Rule B.

(13) Counterfeeding Relationship

Underlying		/dˤrib/	‘beat! (M. SG.)’
Rule B	Ø → [ʔ] / __$_{\sigma}$[V	-----	
Rule A	Ø → V / __#CC	idˤrib	
Phonetic		*[idˤrib]	

The same process can illustrate a counterbleeding interaction. For example, if the rules which are in a bleeding relationship in (12) are reversed, the output is counterbleeding, as in (14). Here, Rule B (palatalization of /s/) occurs in the context of [i], and then Rule A applies, deleting the [i] which was the context of Rule B. Thus, in the unattested surface form with [š], Rule B appears to have overapplied because the context for the rule is no longer on the surface.

(14) Counterbleeding Relationship

Underlying		/ʔu-iskak/	‘jump (3. SG)’
Rule B	[s] → [š] / [i] (C) __	ʔu-iškak	
Rule A	V → Ø / V __	ʔu-škak	
Phonetic		*[ʔu-škak]	

[8] This example provides a hypothetical output; thus, it is notated with a ‘*’.

For more discussion of traditional transparent and opaque rule interactions, see Kiparsky (1971, 1976), McCarthy (2007), and Baković (2011).

Baković (2007, 2011) describes exceptions to the traditional approach to opacity described above. He cites instances which show that not all counterbleeding and counterfeeding interactions result in opaque outputs and that not every instance of opacity from (10a,b) comes from counterfeeding and counterbleeding rule orderings. One such exception to traditional opacity is what he labels self-destructive feeding. A self-destructive feeding relationship produces opaque outputs when Rule A feeds Rule B; often in these instances, Rule B deletes some part of the context for Rule A, so Rule A appears to have overapplied. An example from Turkish (originally described in Sprouse 1997) is given in (15).[9] In this derivation, Rule A (epenthesis of [i] between two consonants) produces the context for Rule B (an intervocalic [k]), which is thus a feeding relationship. Rule B deletes the [k], which was part of the context for Rule A; thus the output is overapplication because the context for Rule A does not appear on the surface.

(15) Self-destructive feeding in Turkish (Baković 2007:226)

Underlying		/bebek-n/	'your baby'
Rule A	Ø → [i] / C __ C#	bebekin	
Rule B	k → Ø / V __ -V[10]	bebein	
Phonetic		[bebein]	

Baković describes self-destructive feeding as follows:

[9] To my knowledge, there are only two such examples of self-destructive feeding interactions in the literature.
[10] Note that this context is a vowel at a morpheme boundary, indicated with '-'.

> But as it turns out, there exist types of feeding rule orders that involve overapplication opacity. One type is what I call SELF-DESTRUCTIVE FEEDING, in which an earlier rule feeds a later rule that in turn crucially changes the string such that the earlier rule's application is no longer justified. … This case is an example of SELF-DESTRUCTIVE FEEDING ON ENVIRONMENT because Deletion crucially changes part of the environment that justified the prior application of Elision. (Baković 2011: 59-60)

> Because self-destructive feeding involves overapplication, and because feeding interactions are prototypically transparent, self-destructive feeding is easy to misidentify as counterbleeding; see, for example, Moreton & Smolensky (2002:315) and Potts & Pullum (2002:384-385), who both misidentify the case in (10) in exactly this way. (Baković 2007:227-8)

I show in chapter 4 that BG has opaque outputs which cannot be accounted for with the traditional understanding of rule interactions discussed above. That is, the BG data show some opaque outputs which do not exhibit counterbleeding or counterfeeding, but rather self-destructive feeding.

1.5 Liquid Vocalizations

The class of liquids consists of sonorant laterals and rhotics; that is, *l* and *r* sounds (Walsh Dickey 1997). These sounds create one class because, as described by Ladefoged & Maddieson (1996:182), "Phonetically they are among the most sonorous of oral consonants. And liquids often form a special class in the phonotactics of a language; for example, segments of this class are often those with the greatest freedom to occur in consonant clusters…"

One cross-linguistic characteristic of liquids is that they often tend to vocalize; i.e. a liquid consonant is realized as a vowel or glide. A frequently-cited example in the literature of liquid vocalization is Standard German (SG) /ʀ/, which is realized as [ɐ] in the nucleus or coda (see, for example, Moulton 1962, Wurzel 1981, Hall 1992b, 1993, Kohler

1995, Wiese 1996, Robinson 2001). Thus, a SG word like *Bruder* 'brother' /bʀudʀ/ is produced as [bʀu.dɐ], where the word-final /ʀ/ surfaces as the mid low vowel [ɐ]. Walsh Dickey (1997:37-38) notes that liquids (either /r/ or /l/ or both) vocalize in many different languages, such as Polish (Carlton 1991), Catalan (Alcover & Moll 1968), and Mehri, a southern Arabian Semitic language (Johnstone 1975).

There are several analyses of liquid vocalizations in the theoretical literature. One is proposed by Walsh Dickey (1997), who analyzes liquids as having multiple place specifications (e.g. [coronal] and [dorsal] in the model in (1)). Vocalization in her approach is analyzed as a deletion of one of these place features. She calls this treatment of liquid vocalizations Coda Simplification (Walsh Dickey 1997:39). Proctor (2009), on the other hand, gives a phonetics based gestural account. He states that "Accounting for liquid vocalization is straightforward under the articulatory model being proposed here: it would result from lenition, deletion or masking of the tongue tip gesture of the liquid" (Proctor 2009:115). He argues that for the vocalization of /l/ in Spanish, if the tongue tip gesture is not completed (does not touch the roof of the mouth in the coronal region), a palatal vowel is the natural output (Proctor 2009:116).

Finally, Glover (2014) gives an analysis of liquid vocalizations in modern German dialects which follows more from traditional analyses of German R-Vocalization (see references above). In his analysis, liquid vocalization is a response to the Coda Law (Vennemann 1988), which he presents as:

(16) Coda Law (adapted in Glover 2014:29)
A syllable coda is the more preferred: (a) the smaller the number of speech sounds in the coda, (b) the greater the sonority of its coda, and (c) the more sharply the sonority decreases from the preceding syllable nucleus to the coda.

The most important aspect of the Coda Law for liquid vocalizations is (16b), where codas with higher sonority are preferred to those with lower sonority.[11] That is, the more like a vowel (in terms of sonority) a coda is, the more preferred it is. Thus, as Glover's (2014) rule of liquid vocalization shows that a [+consonantal] coda liquid becomes [-consonantal], vocalization improves syllable structure, according to (16b). In chapter 5, I adopt a similar analysis to Glover (2014), insofar as the rule of liquid vocalization itself is a process changing a [+consonantal] segment to [-consonantal]. I agree that coda vocalization is a response to the Coda Law to improve syllable structure. However, my BG data for Liquid Vocalization of /l/ are different from the Alemannic dialects which Glover (2014) investigates, and the feature model which I follow (cf. sections 1.2-1.3) differs greatly from the one Glover adopts. Namely, Glover uses underspecification and default rules, while I use the Contrastive Feature Hierarchy discussed in section 1.3.

1.6 Hiatus

Adjacent vowels, i.e. hiatus sequences, are not tolerated in many of the world's languages. In such languages, when hiatus arises (because vowel-final morphemes surface before vowel-initial morphemes), it is often repaired with a phonological process. For example, in the Niger-Congo language Etsako (described by Elimelech 1976), a word-final vowel is deleted when it occurs before a vowel in the following word; see the data in (17), where /ɛ/ deletes before /a/.

(17) Vowel Elision in Etsako (from Casali 1997:493)

/dɛ akpa/	→	[dakpa]	'buy a cup'

[11] See chapters 4 and 5 for more discussion of sonority in BG.

Another repair to hiatus is glide formation, where the first vowel in hiatus is realized as a glide. For example, in Ganda (described in Tucker 1962, Katamba 1985, Clements 1986), an /u/ or /i/ before another vowel is realized as a glide [w] or [j]:

(18) Glide Formation in Ganda (from Casali 2011:1435)

/mu-iko/	→	[mwiː.ko]	'trowel'	cf. [mu-leːnzi]	'boy'
/li-ato/	→	[ljaː.to]	'boats'	cf. [li-ggwa]	'thorn'

One other repair to hiatus is consonant epenthesis, whereby a non-etymological consonant surfaces between adjacent vowels. See, for example, the data in (19), where Axininca Campa (described by Payne 1981) inserts a [t] between vowels when hiatus arises from suffixation.

(19) Axininca Campa [t] Epenthesis (from Lombardi 2002:239)

/i-N-koma-i/	→	[iŋkoma**t**i]	'he will paddle'
/i-N-koma-aa-i/	→	[iŋkoma**t**aa**t**i]	'he will paddle again'

While many languages repair sequences of hiatus, not every language disallows adjacent vowels. Hawaiian (as described by Senturia 1998) is one of these languages where adjacent vowels surface, each in a separate syllable. Representative data are presented in (20).

(20) Hiatus in Hawaiian (From Casali 2011:1434)

[ko.a.na]	'space'
[hu.e.lo]	'tail'

The status of BG hiatus is complex, as hiatus sequences often surface, and yet sometimes they are repaired with the phonological processes discussed above. BG hiatus will be discussed more thoroughly in chapter 6 and will make reference to discussion presented here.

1.7 Consonant Epenthesis and Markedness

As discussed in the previous section, consonant epenthesis is one type of repair to hiatus. The current section explores the nature of a consonant which is inserted as a hiatus breaker in terms of markedness. Theories of markedness have been proposed which are intended to predict which types of consonants should be epenthetic in the context between vowels. In recent literature, several authors have attempted to summarize features of markedness and the various processes which give insight into segment markedness. Rice (2007:80) lists the following classifications in (21) for marked versus unmarked segments,[12] where (21a) concerns non-phonological properties, and (21b) lists phonological properties.

[12] The list given here is an abbreviated version of Rice's terms, specifically in part (21a). For the exhaustive list, see Rice (2007:80). The bold and italic markings are my own.

(21) Markedness Terms

	Marked	Unmarked
a.	less natural	more natural
	more complex	simpler
	less common	more common
	less stable	stable
	appear in few grammars	appear in more grammars
	later in acquisition	earlier in acquisition
	early loss in language deficit	late loss in language deficit
	harder to articulate	easier to articulate
	perceptually more salient	perceptually less salient
b.	subject to neutralization	result of neutralization
	unlikely to be epenthetic	***likely to be epenthetic***
	trigger of assimilation	target of assimilation
	remains in coalescence	lost in coalescence
	retained in deletion	lost in deletion

De Lacy (2006:28) gives similar markedness diagnostics, concluding that epenthesis (among several other processes, including deletion) is a valid diagnostic for determining markedness. His view of markedness classification concerns epenthesis; however, the formulation is different from that of Rice (2007). De Lacy states the following:

> **Deletion**: If /β/ undergoes structurally conditioned deletion and /α/ does not, then there is some markedness hierarchy in which [β] is more marked than [α].
> **Consonant Epenthesis**: If consonant [α] is epenthesized and [β] is not, then there is some markedness hierarchy in which [β] is more marked than [α].

According to de Lacy's diagnostics, marked segments are more likely to be deleted, while unmarked segments are more likely to be epenthetic. Thus, Rice and de Lacy agree that the output of epenthesis should be unmarked. In the literature, discussion of markedness is not restricted to processes which segments undergo (like epenthesis and deletion); rather, markedness is also concerned with individual segments and specific properties of those segments, such as place of articulation. An example of a common place markedness discussion is given below.

Probably the most oft-cited example of consonant epenthesis in the literature is epenthetic [t] in Axininca Campa (Payne 1981), which was presented in the previous section. The data are repeated in (22).

(22) Axininca Campa [t] Epenthesis (from Lombardi 2002:239)

/i-N-koma-i/	→	[iŋkoma**t**i]	'he will paddle'
/i-N-koma-aa-i/	→	[iŋkoma**t**aa**t**i]	'he will paddle again'

Lombardi (2002) discusses this example within the Optimality Theory (OT) framework (Prince & Smolensky 1993) and states that one would expect glottal stop epenthesis here, since glottal is the least-marked place of articulation, according to the hierarchy shown in (23).

(23) Lombardi's Universal Place Hierarchy: *DORS, *LAB » *COR » *PHAR

In Axininca Campa, however, there is a constraint against the glottal segment *ʔ, which is ranked higher than all of the place constraints under the ranking: *ʔ » *DORS, *LAB » *COR » *PHAR; therefore, the next least-marked segment which can be epenthesized is [t]. The high-ranked MARKEDNESS constraint against the glottal stop can account for why this language has the more marked epenthetic coronal stop. Under Lombardi's analysis, the only way to have an output with epenthesis other than glottal is if other markedness constraints intervene to prevent this. She predicts, however, that the output of an epenthesis process should never be labial or dorsal because these places of articulation are too marked. De Lacy (2006: 68) and Uffmann (2007) argue along the lines of Lombardi that a segment with a more marked place of articulation will be the output of epenthesis only if some other markedness scale is at work in the language. Thus, a discussion of consonant epenthesis raises many questions relating to cross-linguistic markedness, such as place of articulation of the epenthetic segment. A brief discussion of English R-Epenthesis is given below, as it relates to BG R-Epenthesis in chapter 6.

Many authors (Sweet 1923, Kenyon 1961, Trudgill 1990, Gutch 1992, McCarthy 1991, 1993, Uffmann 2007, Hall 2013, among others) have discussed the pattern of R-Epenthesis in English dialects in England and the Eastern United States. In these regions, a word-final /r/ is deleted unless followed by a vowel in the next syllable. Realization of this intervocalic [r], called Linking-R, was historically generalized onto words with no etymological /r/, a process known as Intrusive-R or R-Epenthesis. Data showing this are given in (24).[13] The sound transcribed as [r] below is phonetically a central approximant in English, although the claims made in the literature concerning R-Epenthesis also subsume other manners of articulation, e.g. trills.

(24) R-Deletion, Linking-R, and Intrusive-R

a.	ca(r)	~	ca**r** engine
b.	saw	~	saw **-r-** it

[13] The different forms of *r* are represented as follows: an /r/ which is deleted is shown with parentheses around it, as (r). An *r* – either etymological or not – which is pronounced is written in bold. The *r* which is set off by dashes in (24b) is specifically intrusive-r.

The data in (24a) show that etymological /r/ is realized when a vowel follows but is deleted in any other context; (24b) is a vowel-final word which is realized with Intrusive-R when the following word begins with a vowel. Thus, a rule of R-Epenthesis is given in (25), where [r] is inserted between vowels.

(25) R-Epenthesis

Ø → [r] / V __ V

One important factor concerning the application of R-Epenthesis is which vowels can occur before an Epenthetic-R. As can be seen in (24b), an /r/ epenthesizes after a low vowel; in English, R-Epenthesis is restricted to after the vowels [ɑ ə ɔ] (McCarthy 1993 and Hall 2013). McCarthy (1993) calls these vowels the only ‘true’ word-final vowels because after non-low vowels, instead of R-Epenthesis, there is Glide Insertion. Examples from Uffmann (2007:463) are given in (26).

(26) Glide Insertion in English

a.	The key is	[kiː**j**ɪz]	b.	The zoo is	[zuː**w**ɪz]
	The pay is	[peɪ̯**j**ɪz]		The show is	[ʃəʊ̯**w**ɪz]

The data in (26a) show the glide [j] epenthesized after the front non-low vowels [iː eɪ̯], and the data in (26b) show epenthesis of [w] after the back non-low vowels [uː əʊ̯]. Many authors have argued that R-Epenthesis and Glide Insertion are the result of a language’s need to break up vowels in hiatus (see Casali 2011, and references therein).

Authors who have discussed epenthesis from the cross-linguistic perspective (e.g. Lombardi 2002, de Lacy 2006, Rice 2007, among others) usually argue that the output of an epenthesis is an unmarked segment (see discussion above), but cross-linguistically, [r] is generally considered to be a marked sound. This makes the process of English R-Epenthesis very interesting from the perspective of markedness because these claims appear to be contradictory. Scholars cite a number of languages in which an [r] is epenthesized, but in his study of ten languages purported to have R-Epenthesis, Hall (2013) writes that the evidence is inconclusive as to whether or not languages other than English have productive R-Epenthesis. Based on his investigations, Hall (2013: 19-20) writes four hypotheses, two of which are “The lack of consistent data sets motivating a rule of r-Epenthesis in languages other than English is simply accidental” and “The lack of consistent data sets motivating r-Epenthesis in languages other than English is systematic.” BG (one of the ten languages investigated by Hall 2013) is often cited as a language with productive R-Epenthesis. The BG data from my study (presented in chapter 6) do not necessarily (dis)prove either of Hall’s hypotheses; however, they contribute to the picture of cross-linguistic R-Epenthesis.

This discussion of consonant epenthesis and markedness shows why the data in chapter 6 are important: BG Consonant Epenthesis (including R-Epenthesis) has implications for the cross-linguistic study of both epenthesis and markedness theory. While I do not give my analyses within the OT framework, it is clear that the data from chapter 6 bear on these topics, regardless of the theoretical framework applied.

1.8 Summary of the Dissertation

In chapter 2, I focus on demographics and methods. I discuss my BG subjects and give relevant information about the region and town in which they live. I also briefly discuss subjects from Germany who took part in this study, as data from them are used several times in the dissertation for comparative purposes. In the methods section, I explain how data were gathered and what the stimuli were composed of. In addition, I discuss methods used for analyzing audio data and transcribing it into IPA.

Chapter 3 presents the phonology and features of BG. I begin by outlining the underlying consonantal and vocalic segments (including diphthongs) of the dialect by providing contrasts. I present distinctive features for each underlying sound, which are determined via a contrastive hierarchy (cf. section 1.3). The latter part of the chapter uses the contrastive features to analyze several processes which interact with rules involving sonorant consonants.

Chapter 4 focuses on BG nasals and opaque rule interactions which involve that class of sounds. For example, I present data motivating the assimilation of /n/ to the place features of preceding and following stops. An opaque output results when a rule which deletes a following voiced stop applies. I show that opacity in these data exhibit a self-destructive feeding rule order (cf. section 1.4). I analyze two other instances of opacity concerning nasals, one which is the by-product of self-destructive feeding, and another which is the result of counterbleeding.

The focus of chapter 5 is on the phonological patterning of the liquids /l ʀ/. I give the distribution for liquids and show that in the coda, liquids vocalize. Using the features established in chapter 3, I give an analysis of Liquid Vocalization. I also discuss data motivating the dissimilation of vowels in the neighborhood of liquids. In contrast to the nasals (in chapter 4), the processes I discuss in chapter 5 have transparent outputs. Finally, I show data for Liquid Vocalizations in other Germanic languages and dialects.

In chapter 6, I discuss hiatus and its avoidance in BG, showing that BG employs several ways in which hiatus sequences are repaired. The most prevalent repairs involve either Homorganic Glide Formation, Consonant Epenthesis, or Vowel Elision. I discuss BG R-Epenthesis, and I also give data for other epenthetic consonants in BG, showing that consonant epenthesis in English (cf. discussion in section 1.7) and BG are not entirely the same.

In chapter 7, I conclude the dissertation. I summarize the most salient findings of the document, and I show how these new data and analyses enhance not only the field of Germanic linguistics, but also cross-linguistic phonological theory. I also discuss questions which arise from my analyses and suggest directions for future research.

CHAPTER 2

DEMOGRAPHICS AND METHODS

2.1 Introduction

In its initial stages, this project focused only on the process of R-Epenthesis in BG. The goal was to investigate where R-Epenthesis occurs in BG and if there were differences in its application between towns and regions. As the project developed, other unique processes became prominent in the data, so the research focus broadened to include processes involving all sonorant segments of a particular variety of BG. The methods of research (i.e. tasks for subjects to complete) and focuses of data elicitation developed as more data were gathered.

The subjects in this study come from two different BG dialect regions: one in Austria and one in Germany. Data from the Austrian subjects are the central focus of this study; these data, which were collected in the town of Ramsau, are marked in the following chapters with the abbreviation RG (Ramsau German). Data from the German subjects, which were collected in Dachau, are used periodically for comparative purposes and are labeled DG (Dachau German). The term Bavarian German (BG) is used to refer to the larger dialect region (discussed below).

The following is a summary of both the demographics of my subjects as well as the methods used to elicit and analyze data.

2.2 Demographics

2.2.1 Bavarian German

The term "Bavarian German" refers to language spoken in the German state of Bavaria and most of Austria, including the states of Upper Austria, Lower Austria, Salzburg, Styria, Burgenland, Carinthia, and Tyrol (Zehetner 1985:58). BG is an Upper German dialect of High German, which is divided into three areas: South, Central, and North Bavarian.[14] Transition zones between these areas are also recognized as the separate dialect regions North Central Bavarian and South Central Bavarian (Zehetner 1985:61, Wiesinger 1990:447-456).

BG as a whole is characterized by certain phonological, morphological, and syntactic differences from Standard German. For example, SG front rounded vowels (umlauted vowels) surface as front unrounded vowels throughout all regions of BG, so a word like SG *mögen* [møgən] 'to like' is realized as BG [meŋ] (Wiesinger 1990:452-456). Some synchronic phonological and morphological changes apply to all of BG, while others differentiate the individual regions within BG. This dissertation explores data, such as *mögen* given above, from my subjects who live in specific regions of BG (see below). Thus, the data presented here are not intended to be representative of all of BG, but rather of the regions where the data were collected.

2.2.2 Austrian Subjects

The majority of data cited in this study comes from speakers living in Ramsau am Dachstein in the Austrian state of Styria. Ramsau is a small village with a population of

[14] Alemannic and East Franconian are the other dialects which belong to Upper German.

2,770 (Statistik Austria), which is located on a plateau in the middle of a mountain. Ramsau is in the South Central Bavarian dialect region (Wiesinger 1990:471-474). The village overlooks the Enns Valley (*Ennstal*), in which Schladming, a larger town and popular ski destination, is located. On the other side of Ramsau, the mountain range Dachstein rises steeply; it is also a popular destination for skiing in the winter and hiking in the summer.

Several of my subjects relayed the history recorded below about the settling of Ramsau am Dachstein. In the years of the Reformation and Counter-reformation during the 16th century, Catholics and Protestants lived in the valley, where the river Enns runs between the tall Alps. This land is much more passable and easy to travel through than up in the mountains, so nearly all settlements were in the valley. At that time, there was a decree from the government that the entire country and its population were to be Catholic. The monarchy sent out troops from Vienna all the way through the mountains to rid the country of any Protestants. As these troops came through the Enns Valley, the Protestants in the area around Schladming fled up the mountain Dachstein with their families to save their lives. The Protestants reached the safety on the plateau at Ramsau and settled the land there. The soldiers chose not to follow, as the mountain was steep and difficult to pass; instead, they continued on through the valley to other areas of the empire.

Centuries later, the village of Ramsau is still almost entirely Protestant. Many inhabitants farm the land or keep livestock; others work in hand crafts such as wood-working. There are a few businesses in Ramsau which cater to tourism, such as restaurants, lodges, and small stores, but the majority of goods and commerce are found in the valley in the town of Schladming. It still takes a concerted effort to get to Ramsau, but the roads are good (albeit steep and winding), and they are kept passable in winter. Like my subjects, most residents of Ramsau are from the village; many people born in Ramsau have resided there their entire lives.

Although the dialect spoken in Ramsau comes in contact with other varieties and standardized versions (through television, tourism, and traveling by the residents themselves), for the most part, speakers in Ramsau have kept their dialect intact. In the home, dialect is spoken nearly exclusively. Children learn SG in school, but most of their daily interactions are in dialect. Because of all of these factors, my subjects in Ramsau are an excellent source of data for the South Central Bavarian dialect.

My initial pilot studies (described in section 2.3) investigated a broader sampling of subjects from different towns and regions within the state of Styria, specifically speakers who live in Schladming or in other villages or houses in the Austrian Alps. While all of these speakers have a similar variety of BG, there are some differences between these regions, particularly in vowels. Therefore, the extended study of BG focuses mostly on three speakers from Ramsau am Dachstein. These speakers ranged in age from 35-50 and included two men and a woman. The men were born and raised in Ramsau and live there now with their families. The woman is from another Styrian town about an hour from Ramsau, but she married a man from Ramsau and has spent her adult life there. Her data do not vary in any significant way from the two men from Ramsau. Each recording session took place in the subjects' homes, around the kitchen table, with the exception of the last recording session, which was in a public park.

2.2.3 German Subjects

In addition to the subjects from Styria, I also gathered data from speakers of an entirely different variety of BG: Central Bavarian spoken about 20 kilometers outside of Munich, Bavaria in the town of Dachau. There, I gathered data from 7 subjects who work as either administrative assistants or teachers at a local *Gymnasium* 'high school' in Dachau. Recording sessions occurred on two weekdays at the school in either quiet, unused classrooms or an office. Several of the teachers recorded use a more standard variety with their students; all subjects, however, converse in dialect on a daily basis. Each speaker from Dachau is a German who lives either in or near Dachau (in the larger metropolitan area surrounding Munich) and is from Bavaria and grew up speaking dialect. In comparison to Styria, where dialectal differences can be noted depending upon which mountain your hometown resides, it is my impression that speakers of BG in and around Munich speak a relatively uniform variant of BG. Though the speakers themselves are originally from differing surrounding towns, the BG of my subjects in Dachau is considered one variety.

Speakers of BG in the larger metropolitan area around Munich encounter multiple varieties of German each day for various reasons. As with the subjects in Styria, much media which the subjects are exposed to, such as television and radio, is in SG. In addition to this, Munich is a large city which attracts tourists during all seasons of the year; tourists speak different varieties of German, as well as languages other than German. Furthermore, residents of Bavaria are exposed to speakers of German with foreign accent (such as Americans who live in Germany). Although the BG subjects encounter these other varieties of language regularly, they retain their BG heritage by speaking BG at home, with friends, and in their communities.

As noted above, most of the data given in this dissertation are from the Styrian subjects. However, there are several occasions where the data from the Dachau speakers differ in an interesting way. In these instances, I draw comparison between the two Bavarian dialects.

2.3 Pilot Studies

During the summers of 2011-2012, I conducted pilot studies by gathering data in Styria. The first summer, I compiled the list of words and phrases containing R-Epenthesis cited in Schmeller (1821), supplemented by data from Zehetner (1985) and Merkle (2005), and asked speakers in this region to simply read the lists aloud in their dialect. Some speakers found it difficult not to use their standard German pronunciation when reading, but more than half of the informants produced dialectal speech. The results of this first pilot study were promising. The data showed that in modern BG, speakers epenthesize [ʁ] within a compound word (1a), between a number and noun (1b), between an inflected verb and pronoun (1c), and after the word *wie* (1d).

(1) Examples of R-Epenthesis in Modern BG

	Bavarian German	**English**
a.	zwei**-r-**undzwanzig	*twenty-two*
b.	zwei **-r-** Augen	*two eyes*
c.	dann tue **-r-** ich	*then I do*
d.	wie **-r-** ich sage	*like I say*

These results were encouraging for several reasons. First, the data confirmed that there is still R-Epenthesis in this dialect, nearly 200 years after it was first recorded. Second, these data showed that many examples from Schmeller's original grammar are still the words and phrases where R-Epenthesis occurs. However, speakers produced R-Epenthesis for only about half of the examples in Schmeller, which means that not all of the words and phrases from Schmeller are relevant examples of current BG R-Epenthesis. It is hard to know exactly why certain phrases have R-Epenthesis and others do not.

The data gathered in the summer of 2012 were a first step at a deeper investigation of R-Epenthesis. I created new word and phrase lists not previously cited in the literature, focusing on examples of vowels in hiatus. Some words and phrases were based on similar examples where R-Epenthesis was produced the previous summer. The second pilot study was fruitful because there were several new examples of R-Epenthesis not recorded in the literature; this prepared me to conduct the more extended study described in the next section.

2.4 Year-Long Study

2.4.1 Methods of Data Elicitation

During the academic year 2013-14, I travelled to Austria four times to record subjects' speech. On each of these trips, I took prepared stimuli for subjects to read aloud. Stimuli were written in SG, and subjects were asked to produce the written words and phrases in RG. Sometimes, due to various factors, such as lack of daily usage of certain words, subjects never produced particular words or phrases in dialect.

As proposed in Bowern (2008:212), tasks contained wordlists, phrases, sentences, and short text. One of the most productive tasks, wordlists, was surprisingly illustrative, even though this is a rather sterile task, as words are not given in sentence context. Though Bowern (2008:67) cautions against subjects reading lists, wordlists helped to target specific contexts and sequences of phonemes. I began with a “customized” wordlist (Vaux, Cooper, & Tucker 2007:70), which focused in the first trip on contexts for /ʀ/ and R-Epenthesis, and customization developed with each successive trip, as the scope of investigation broadened. Examples of one of the wordlists is given in (2)

(2) Wordlist designed to elicit word-initial /ʀ/

Standard German	**English**
Ritter	‘knight’
Regen	‘rain’
Rad	‘wheel’
Roman	‘novel’
Ruck	‘jolt’
richtig	‘correct’
regelmäßig	‘regular’
rabenschwarz	‘jet-black’
rot	‘red’
ruhig	‘calm’
riechen	‘to smell’
rennen	‘to run’
raten	‘to guess’
rollen	‘to roll’
rudern	‘to row’

Other productive tasks included phrases and short sentences. Oftentimes, the multiple words in phrases helped subjects get into the rhythm of dialectal speech, and they were able to produce forms more fluidly. Short sentences also offered the benefit of fluid speech and gave speakers a context for each word. However, words at the end of the sentence were sometimes unclear or indecipherable because of speech rate and falling intonation. I followed Bowern (2008:39) throughout the interviews in asking subjects to repeat or slow down a word or phrase if it was entirely unintelligible. Examples of phrases and short sentences I used are given in (3-4).

(3) Phrases designed to elicit alternation of [ɐ] ~ [ʀ]

Standard German	**English**
schier ~ ein schierer Wahnsinn	'sheer ~ sheer insanity'
wirr ~ ein wirrer Tag	'confused ~ a confused day'
schwer ~ ein schwerer Auftrag	'difficult ~ a difficult task'
klar ~ ein klarer Diamant	'clear ~ a clear diamond'
stur ~ ein sturer Esel	'stubborn ~ a stubborn donkey'
dürr ~ ein dürrer Wind	'arid ~ an arid wind'
sauber ~ ein sauberer Raum	'clean ~ a clean room'

(4) Sentences designed to elicit intervocalic /ʀ/

Er reißt das Papier aus dem Heft.
'He rips the paper out of the notebook.'

Der Herr und seine Frau kommen ins Restaurant.
'The man and his wife come into the restaurant.'

Das Paar ist sehr glücklich.
'The couple is very happy.'

Wir wollen das Tor am Stadtrand heute anschauen.
'We want to see the gate on the outskirts of the city today'

Die Uhr über der Tür ist aus dem Schwarzwald.
'The clock over the door is from the Black Forest.'

Der Steirer ist gern Ski gefahren.
'The Styrian liked to ski.'

Das Buch ist sehr teuer. Verlier es nicht!
'The book is very expensive. Don't lose it!'

Bohr in dem Loch da drüben!
'Drill in the hole over there!'

Hör ihm bitte zu!
'Please listen to him!'

Several tasks proved less successful for my subjects. The first of these was an invented text, as suggested in Vaux, Cooper, & Tucker (2007:105-107). In theory, this short story would be an opportunity to combine many tokens in one task and keep the target words hidden from the subjects. However, consecutive sentences significantly slowed down the processing time subjects needed to translate SG into dialect, and they often stumbled over words which they knew but did not use regularly.

Another task which was less successful was narrating a story based on sequences of pictures. This task aimed to diversify word choices, while also giving subjects a topic to discuss and speak freely about. In actuality, while there was some variety of nouns, subjects spoke in short sentences and did not generally add many extraneous words. Therefore, this task produced little data, most of which contained the same nouns and verbs repeated multiple times.

Finally, as proposed in Vaux, Cooper, & Tucker (2007:102-104), subjects were asked to tell a personal narrative – a story from childhood. This was the best opportunity for freely-spoken and uninhibited dialect. While there were no issues in getting subjects to produce smooth dialectal speech with this task, the stories tended to be short, and, as was the case with narrating a story of pictures, the vocabulary was limited. Subjects producing, for example, R-Epenthesis or Liquid Vocalization of /l/ with this task was chance. If subjects produced specific words or combinations of adjacent words, these processes occurred; otherwise I necessarily relied on the prepared stimuli for such data. Ultimately, the personal narrative was a good task to verify certain sounds in the dialect, since out of all the tasks the subjects performed, this task represented the dialect in its truest form. However, as speakers rarely produced specific words or sequences of words which were under investigation, very little of this data was helpful in analyzing the processes examined for this document.

Subjects reacted differently to the various tasks. Often, they would pause in the middle of wordlists and take time to think about how they might say something. Other times (and this depended on the speaker), they would flow from one word to the next in a wordlist, just as easily as they would from word to word within a sentence. One speaker in particular was consistent in not producing words which were uncommon in the dialect; at these times, this subject would tell me "I don't know that word," or "I wouldn't say it this way."

In general, the shorter the text length, the easier it was for the speakers to process and produce dialect forms. One reason for this is that they could focus on just a few words and think about how to say the words before speaking. Another part of this is that in longer strings of text, they often became fixated on word choice. This dissertation does not focus on the differences in word choice (for example, in SG the word for 'roll' is *Brötchen*, while in BG, speakers use *Semmel*), but rather, the phonology of the dialect is investigated. Nevertheless, the subjects often focused on word choice and providing the most typical dialect word, particularly if it differed substantially from SG. When encountering an unfamiliar word, speakers often hesitated. Sometimes, as noted above, they would simply state that they did not know that word and would not say it; other times, they read it slowly and with SG pronunciation. On other occasions, subjects might read an unfamiliar word within the phonology of their dialect. This last option occurred most frequently when speakers did not pause and think about each token but kept reading everything rather quickly, regardless of how common or foreign a word seemed to them.

In order to elicit a variety of examples for BG diminutives, one task subjects were asked to perform was to read a noun and then produce the BG diminutive of that noun. Two of the speakers had more difficulty with this task than any other. While this activity was conducted, two of the speakers' children (both under 10 years old) were listening. For several examples where the parents stated that there was no possible diminutive, the children provided it. No such data are included in the findings here, as the study's IRB approval does not extend to research with minors. However, it is interesting to note that children were more accepting of examples where the diminutive suffix was added to a noun than their parents.

2.4.2 Methods of Data Analysis

All sessions with subjects were recorded on a Zoom H2 recorder and saved as WAV files. Subjects agreed to be recorded, and the recorder itself sat between interviewer and subjects. The audio recordings were analyzed with the phonetic software Praat (Boersma & Weenink 2013), which shows both waveforms and spectrograms.

Initially, audio data were transcribed into IPA in a "maximally narrow transcription" (Vaux, Cooper, & Tucker 2007: 57), and until the phonological system was understood, "phonemicizing" was avoided (Vaux, Cooper, & Tucker 2007: 58). Later (following Bowern 2008:64), once the phonemes and the phonological system of the dialect were understood, I transcribed consistently and phonemically (rather than including every aspect of the speech signal). Therefore, transcriptions are generally broad; that is, phonemes are given, not every allophone thereof. For example, aspiration of voiceless stop phonemes /p t k/ is not denoted with the symbols [pʰ tʰ kʰ]. Similarly, vowel-initial words are not transcribed with the glottal stop [ʔ] unless the phonological rule of glottal stop epenthesis is under discussion. An exception to this generalization, however, is with the velar and palatal fricatives [x] and [ç]; these are always transcribed narrowly, as in standard pronouncing dictionaries, such as *Duden* (Wermke et. al. 2003).

Transcriptions are based on the sounds heard when the recordings were played aloud. A table was made of the average range of formant values for each vowel of each speaker, and whenever there was uncertainty as to the quality of a particular vowel or consonant, formants in the spectrogram were consulted. Following Bowern (2008:67), I simply asked speakers where they produced /ʀ/, rather than relying on the audio data and spectrograms to ascertain this.

CHAPTER 3

RG PHONOLOGY AND FEATURES

3.1 Introduction

In order to thoroughly describe the RG sonorants, as well as to analyze the various processes which these sounds undergo, it is important to first understand certain aspects of RG phonology. In this chapter, I discuss phonological phenomena (distribution of phonemes, allophonic processes and alternations) in order to arrive at a set of features for RG. This chapter lays the groundwork for my analyses of RG sonorants in subsequent chapters. The phonological rules discussed in this chapter interact transparently.

In section 3.2, I discuss the distribution of RG consonants and assign distinctive features for RG consonant phonemes. I present the RG vowel system in section 3.3, including distinctive features for vowels, as well as figures and features for RG diphthongs. Section 3.4 contains discussion of relevant phonological processes, which offer support to the features in sections 3.2 and 3.3. Analyses are presented in terms of features and Feature Geometry (cf. McCarthy 1988). Processes include Diphthongization, Dorsal Fricative Assimilation and Debuccalization, Umlaut, Final Devoicing, and Glide Formation. I conclude in section 3.5.

3.2 RG Consonants

3.2.1 RG Consonant Distribution

The RG consonants in (1) are similar to those in SG. One of the differences between RG and SG is that RG has only one voiced fricative: [v]. There is no voiced alveolar [z], as in the first sound in SG *singen* ‘to sing’; [z] corresponds to [s] in RG.

(1) RG Consonant Phonemes

		OBSTRUENTS		
VCLESS STOPS	p	t		k
VC STOPS	b	d		g
AFFRICATES	pf	ts	ʧ	
VCLESS FRICATIVES	f	s	ʃ	x
VC FRICATIVES	v			
		SONORANTS		
NASALS	m	n		ŋ
LIQUIDS		l		ʀ

Other differences between RG and SG consonants concern allophones, given in (2). For example, there is a flap allophone of /ʀ/ in RG which does not occur in SG. In addition to that, I analyze both [ç] and [h] as allophones of /x/ (see data and discussion in section 3.4.2). While these tables include all the possible RG consonants, most discussion below, including feature matrices, is reserved for phonemes (consonants in (1)) which figure into the phonological processes relevant to this dissertation.[15]

[15] The glides [j] and [w] do not appear in the tables in (1-2); these are discussed in section 3.4.5.

(2) RG Consonant Allophones

	OBSTRUENTS		
VCLESS STOPS			ʔ
VCLESS FRICATIVES		ç	h
	SONORANTS		
LIQUIDS	ɾ		

The data sets which follow present all of the RG phonemes in the various contexts in which they occur. The data in (3-5) show contrasts between RG voiceless and voiced stops of the different places of articulation: labial in (3), coronal in (4), and dorsal in (5). The voiced and voiceless stops contrast word-initially in (3a, 4a, 5a), in word-initial consonant clusters in (3b, 4b, 5b), and word-internally in (3c, 4c, 5c). Word-finally in (3d, 4d, 5d) and in a word-final consonant cluster in (3e, 4e, 5e), voiced and voiceless stops do not contrast; only the voiceless stops occur in this context. This is due to a neutralization of coda obstruents known as Final Devoicing, which will be discussed in greater depth in section 3.4.4.

(3) /p/ and /b/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a. Word-Initial					
[p̱ak]	*Park*	‘park’	[ḇam]	*Baum*	‘tree’
b. Word-Initial Cluster					
[p̱ʀo.bə]	*Probe*	‘sample’	[ḇʀot]	*Brot*	‘bread’
c. Word-Internal					
[su.p̱ɐ]	*super*	‘super’	[pʀo.ḇə]	*Probe*	‘sample’
d. Word-Final					
[liə̯p̱]	*lieb*	‘dear’			
e. Word-Final Cluster					
[gɪp̱t]	*gibt* (3. SG.)	‘to give’			

(4) /t/ and /d/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initial				
[ṯɪʃ]	*Tisch*	‘table’	[ḏɪs]	*das*	‘the’
b.	Word-Initial Cluster				
[ṯʀo.fe]	*Trophäe*	‘trophy’	[ḏʀɪm]	*drüben*	‘over there’
c.	Word-Internal				
[pʀo.ṯo.kɔɪ̯]	*Protokoll*	‘protocol’	[mo.ḏɛ.lə]	*Modelle*	‘model’
[ti.ṯl̩]	*Titel*	‘title’	[diɐ̯n.ḏl̩]	*Dirndl*	‘dirndl’
d.	Word-Final				
[laɪ̯ṯ]	*Leute*	‘people’			
e.	Word-Final Cluster				
[gɪpṯ]	*gibt* (3. SG.)	‘to give’			
[fʀokṯ]	*fragt* (3. SG.)	‘to ask’			
[lʊfṯ]	*Luft*	‘air’			
[gvisṯ]	*gewusst* (PP.)	‘to know’			
[moxṯ]	*macht* (3. SG.)	‘to do’			
[kemṯ]	*kommt* (3. SG.)	‘to come’			
[fɪnṯ]	*finde* (1. SG.)	‘to find’			
[hɛŋṯ]	*hängt* (3. SG.)	‘to hang’			
[vaɪ̯.nəxṯs]	*Weihnachts*	‘Christmas’			

(5) /k/ and /g/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initial				
[ḵɪnt]	*Kind*	‘child’	[g̱ɪpt]	*gibt* (3. SG.)	‘to give’
b.	Word-Initial Cluster				
[ḵla.viɐ̯]	*Klavier*	‘piano’	[g̱lɔt]	*glatt*	‘smooth’
[ḵʀo.nə]	*Krone*	‘crown’	[g̱ʀɔ.ə]	*graue*	‘grey’
c.	Word-Internal				
[ə.ti.ḵl̩]	*Artikel*	‘article’	[fli.g̱l̩]	*Flügel*	‘wing’
d.	Word-Final				
[paḵ]	*Park*	‘park’			
e.	Word-Final Cluster				
[dɛŋḵ]	*gedacht* (PP.)	‘to think’			
[fʀoḵt]	*fragt* (3. SG.)	‘to ask’			

The data in (6-8) give the distribution of RG fricatives. The data in (6) show contexts where the voiced and voiceless labial fricatives contrast: /f/ and /v/ contrast word-initially in (6a) and word-internally in (6c). As with the stops, only the voiceless fricative occurs word-finally in (6d) and in a word-final consonant cluster in (6e). In a word-initial consonant cluster in (6b), /f/ occurs before a consonant ([ʀ] or [l]), while /v/ occurs after a consonant ([k] or [ʃ]).

(6) /f/ and /v/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initial				
[f̲ɔɪ̯]	*voll*	‘full’	[v̲ʊɪ̯]	*will* (3. SG.)	‘to want’
b.	Word-Initial Cluster				
[f̲ʀokt]	*fragen* (INF.)	‘to ask’	[kv̲ɪ.ɾl̩]	*Quirl*	‘beater’
[f̲lɛk]	*Fleck*	‘fleck’	[ʃv̲e.stɐ]	*Schwester*	‘sister’
c.	Word-Internal				
[tʀo.f̲e]	*Trophäe*	‘trophy’	[kla.v̲iɐ̯]	*Klavier*	‘piano’
d.	Word-Final				
[bon.hof̲]	*Bahnhof*	‘train station’			
e.	Word-Final Cluster				
[kaf̲t]	*kauft* (3. SG.)	‘to buy’			

The data in (7) show that the voiceless coronal fricatives /s/ and /ʃ/ contrast word-initially in (7a) and word-internally in (7c), as well as word-finally in (7d). In a word-initial consonant cluster in (7b), /s/ occurs before [k], while /ʃ/ occurs before other consonants, as in SG (see Wiese 1996, Alderete 1997, and Alber 2001 for analyses of this distribution in SG). /s/ occurs in word-final consonant clusters, while /ʃ/ does not, as in (7e).

(7) /s/ and /ʃ/

RG	SG	Eng.	RG	SG	Eng.
a.	Word-Initial				
[s̱e]	*See*	‘sea’	[ʃ̱ẽ]	*schön*	‘pretty’
b.	Word-Initial Cluster				
[s̱kʊlp.tuɐ̯]	*Skulptur*	‘sculpture’	[ʃ̱tuɪ̯n]	*still in*	‘silent in’
			[ʃ̱pe.tɐ]	*später*	‘later’
			[ʃ̱vɪ.mə]	*Schwimmen*	‘swimming’
			[ʃ̱neɪ̯]	*schnell*	‘fast’
			[ʃ̱miɐ̯n]	*schmieren*(INF.)	‘to smear’
			[ʃ̱los]	*Schloss*	‘lock’
			[ʃ̱ʀaɪ̯]	*schreie ich*	‘I cry’
c.	Word-Internal				
[mʊ.s̱en]	*Museen*	‘museums’	[vʊn.də.ʃ̱e.nə]	*wunderschöne*	‘beautiful’
d.	Word-Final				
[dɪs̱]	*das*	‘the’	[tɪʃ̱]	*Tisch*	‘table’
e.	Word-Final Cluster				
[gvis̱t]	*gewusst* (PP.)	‘to know’			
[dans̱t]	*tanzt* (3. SG.)	‘dances’			
[kʊns̱t]	*Kunst*	‘art’			
[vaɪ̯.nəxts̱]	*Weihnachts*	‘Christmas’			

It can be observed that the dorsal fricative /x/ contrasts with /k/ after a back vowel word-finally in (8a) and in a word-final consonant cluster in (8b).

(8) /x/ and /k/

RG	SG	Eng.	RG	SG	Eng.
a.	Word-Final				
[hox̱]	*hoch*	‘high’	[moḵ]	*mag* (3. SG.)	‘to like’
b.	Word-Final Cluster				
[mox̱t]	*macht* (3. SG.)	‘to do’	[fʀoḵt]	*fragt* (3. SG.)	‘to ask’

There are three phonemic affricates in RG: /pf, ts, ʧ/. Data showing that these affricates contrast with other phonemic obstruents are given in (9-11). I do not give an exhaustive list of every possible context and contrasting obstruent; however, these data are representative of the contexts in which affricates can contrast. (9a) shows [pf] contrasting with [f, p] word-initially; (9b) shows [pf] ~ [f] in a word-initial cluster; and (9c) shows [pf] ~ [f] word-finally.

(9) /pf/ and /p/, /f/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initial				
[pfiɐ̯.te]	*Pfirte*	'greeting'	[fiɐ̯]	*vier*	'four'
[pfaʊ̯]	*Pfau*	'peacock'	[pak]	*Park*	'park'
b.	Word-Initial Cluster				
[pflɪçt]	*Pflicht*	'duty'	[flɛk]	*Fleck*	'fleck'
c.	Word-Final				
[kopf]	*Kopf*	'head'	[bon.hof]	*Bahnhof*	'train station'

Data for [ts] are given in (10), where [ts] ~ [t] word-initially in (10a), and [ts] ~ [s] word-finally in (10b).

(10) /ts/ and /t/, /s/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initital				
[tsɔɪ̯n]	*bezahlen* (INF.)	'to pay'	[tɔɪ̯]	*Tal*	'valley'
b.	Word-Final				
[sɔɪ̯ts]	*Salz*	'salt'	[hɔɪ̯s]	*Hals*	'throat'

The data in (11) show that the affricates [ts] and [ʧ] contrast word-finally.

(11) Word-Final /ts/ and /ʧ/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
[sɪts]	*Sitz*	‘seat’	[ʀʊʧ]	*Rutsch*	‘skid’

In this dissertation, I am not concerned with the issue discussed in earlier phonological literature (cf. Trubetzkoy 1939) of whether or not sounds like [ts], [pf], and [ʧ] are monosegmental (i.e. affricates) or disegmental (i.e. a sequence of two segments). I provide no explicit arguments that [ts], [pf], and [ʧ] are affricates; rather, this is an assumption I share with recent authors (cf. Sagey 1986, Lombardi 1990, Rubach 1994, Wiese 1996, Kehrein 2002, and Hall 2004, 2012).

Data showing the distribution of RG nasals are given in (12). As in SG, only [m, n] can occur word-initially, as in (12a); all three nasals [m, n, ŋ] contrast word-internally in (12b) and word-finally in (12c).

(12) /m/, /n/, and /ŋ/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Word-Initial				
[ne.mə]	*nehmen* (INF.)	‘to take’	[mɪ.sn̩]	*müssen* (INF.)	‘must’
b.	Word-Internal				
[ke.nə]	*können* (INF.)	‘can’	[ne.mə]	*nehmen* (INF.)	‘to take’
[ʃvɪ.mə]	*schwimmen* (INF.)	‘to swim’	[si.ŋə]	*singen* (INF.)	‘to sing’
c.	Word-Final				
[vin]	*Wien*	‘Vienna’	[ʀɛŋ]	*Regen*	‘rain’
[gem]	*geben* (INF.)	‘to give’			

The distribution of the RG liquids [l, ʀ] is given in (13). The liquids contrast word-initially in (13a) and in a word-internal onset in (13b).

(13) /l/ and /ʀ/

RG	SG	Eng.	RG	SG	Eng.
a.	Word-Initial				
[l̠ʊft]	*Luft*	‘air’	[ʀ̠ʊk]	*Ruck*	‘twitch’
b.	Word-Internal				
[fe.l̠ɐ]	*Fehler*	‘mistake’	[le.ʀ̠ɐ]	*Lehrer*	‘teacher’

Neither [ʀ] nor [l] occur in codas following a vowel, a position in which both RG /ʀ/ and /l/ vocalize. Data for this and an analysis of Liquid Vocalization will be given in chapter 5.

There are two possible consonantal realizations of phonemic RG *r*: either apical (coronal) trill [r] or uvular (dorsal) trill [ʀ] (like SG). Most of my speakers in Styria produce *r* as the uvular trill; however, the apical trill is equally acceptable to them as listeners. RG speakers are aware that there are two different ways to pronounce *r*. In conversation, I asked several speakers where they say *r*, and they responded with either “*Ich rolle hinten*.” for uvular [ʀ] or “*Ich rolle vorne*.” for apical [r].[16] While this difference in place of articulation is interesting from the standpoint of phonetics, for my phonological analysis, I am only concerned with how *r* behaves phonologically. It will be shown in chapter 5 that *r* is phonologically dorsal /ʀ/, regardless of whether or not speakers produce *r* phonetically as apical or uvular. Therefore, I transcribe RG *r* throughout this dissertation as [ʀ].

In the next section, I present distinctive features for the RG consonants discussed above. These features are relevant for analyses of phonological processes in RG in section 3.4 of the present chapter as well as analyses given in subsequent chapters.

[16] Literally “I roll in the back.” and “I roll in the front.”

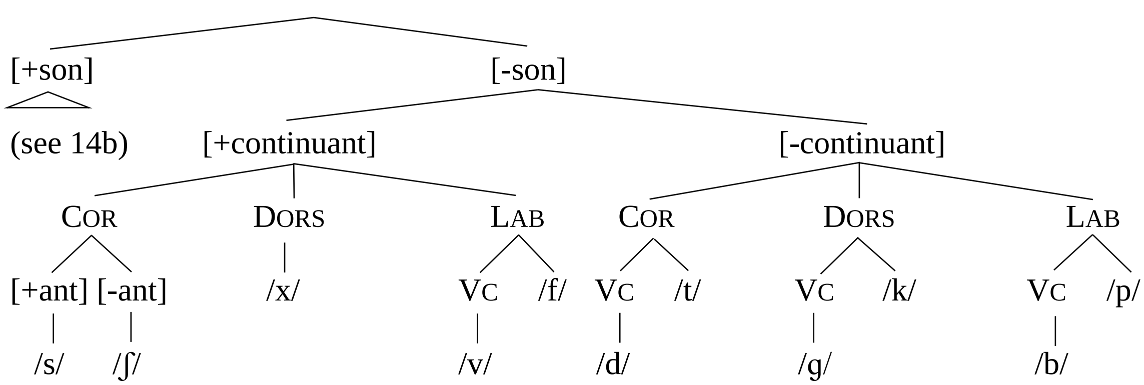
3.2.2 Distinctive Features of RG Consonants

I follow the framework developed in Dresher (2009), who proposes that distinctive features are determined by a contrastive hierarchy; recall discussion in chapter 1. The contrastive feature hierarchy for RG consonants, given in (14), is created with the Successive Division Algorithm (Dresher 2009:16). It is important to note that, in using a feature hierarchy, not all segments are specified for each consonantal feature. For example, the feature [continuant] is only distinctive for obstruents in (14a) and not sonorants in (14b). Likewise, [nasal] is distinctive only for sonorants and not obstruents. When a segment is not contrastive for a certain feature, it has no specification for it. For example, only coronal fricatives contrast in terms of the feature [anterior]; thus, coronal fricatives have specifications for [anterior], but the coronal stops /t/ and /d/ do not.

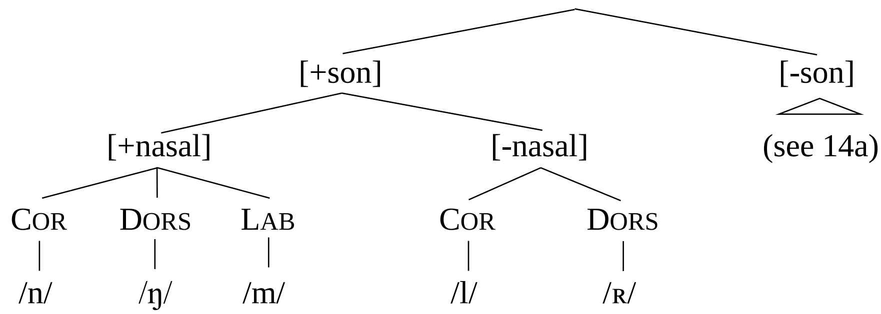
(14) Hierarchy for Contrastive Features of RG Consonants:

[sonorant] > [continuant], [nasal] > DORSAL, CORONAL, LABIAL > [anterior], VOICE

a. RG Obstruents



b. RG Sonorant Consonants



It should be noted that in Feature Geometry, LARYNGEAL is the node dominating VOICE, but for purposes of simplicity in the hierarchies here, LARYNGEAL is not given. It is understood, however, that if an obstruent has the contrastive privative feature VOICE, LARYNGEAL will be present in feature representations. As affricates do not play a role in the dissertation (as discussed above), they are not included in the feature hierarchy in (14) or in the matrices in (15). I leave open how they should be analyzed. Not all divisions in (14) are binary (cf. discussion of the SDA in chapter 1); specifically, most place contrasts in (14) are ternary; the same holds for vowels (see below).

In (15), I give feature matrices for RG obstruent phonemes. Because only underlying segments are given in this table, [h] and the palatal fricative [ç], both derived from the dorsal fricative /x/, are not shown. These allophones and their features will be discussed in section 3.4.2 on Dorsal Fricative Assimilation and Debuccalization. The glottal stop [ʔ] is also not given in (15) and will be discussed in chapter 6.

(15) Distinctive Features of RG Obstruents

	/p/	/b/	/t/	/d/	/k/	/g/	/f/	/v/	/s/	/ʃ/	/x/
[sonorant]	–	–	–	–	–	–	–	–	–	–	–
[consonantal]	+	+	+	+	+	+	+	+	+	+	+
[continuant]	–	–	–	–	–	–	+	+	+	+	+
LARYNGEAL		✓		✓		✓		✓			
VOICE		✓		✓		✓		✓			
PLACE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LABIAL	✓	✓					✓	✓			
CORONAL			✓	✓					✓	✓	
[anterior]									+	–	
DORSAL					✓	✓					✓

Feature matrices for RG sonorant phonemes are given in (16). Within the classes of nasals and liquids, place features distinguish the individual members. For example, the difference between the three nasals is whether they are LABIAL, CORONAL, or DORSAL. This is the same for the liquids: /l/ is CORONAL, and /ʀ/ is DORSAL. One could alternatively argue that /l/ is [-continuant] and /ʀ/ is [+continuant], in which case the place features for those sounds would not be distinctive.[17] However, as the analysis of liquid vocalizations in chapter 5 argues for the PLACE specifications shown below (and not a particular value for [continuant]), liquids need to be marked for place features. Thus, the feature [continuant] is only distinctive for obstruents and not for sonorants.

[17] For discussion of liquids in terms of the feature [continuant] in another German dialect, see Glover (2011).

(16) Distinctive Features of RG Sonorants

	/m/	/n/	/ŋ/	/l/	/ʀ/
[sonorant]	+	+	+	+	+
[consonantal]	+	+	+	+	+
[nasal]	+	+	+	–	–
PLACE	✓	✓	✓	✓	✓
LABIAL	✓				
CORONAL		✓		✓	
DORSAL			✓		✓

The blanks present in the matrices for consonants in (15-16) and the vowels in (27) do not reflect ‘underspecified’ values that are added by default rules. For example, [continuant] is only distinctive for obstruents and not for sonorants. Thus, there are no default rules stating that nasals and /l/ are [-continuant] and /ʀ/ is [+continuant]. In this respect, my approach is very different from earlier ones in German (cf. Yu 1992, Hall 1993:90, Wiese 1996:171, Glover 2014).

3.3 RG Vowels

3.3.1 RG Vowel Distribution

As in SG, RG has a variety of phonemic monophthongs, ranging in height and frontness/backness. The RG distribution is given in (17). In phonetics, [a] and [ə] are analyzed as central, but the approach taken here only requires a two-way distinction (front vs. back).

(17) RG Phonemic Monophthongs

	FRONT			BACK	
HIGH	i	ɪ		ʊ	u
MID	e	ɛ	ə	ɔ	o
LOW			a		

I show contrasts between RG /i/ and /ɪ/ in (18), /e/ and /ɛ/ in (19), /u/ and /ʊ/ in (20), /o/ and /ɔ/ in (21), and /a/ and /o/ in (22). These vowels are shown to contrast word-internally in an open syllable in (18a, 19a, 20a, 21a, 22a) and in a closed syllable in (18b, 19b, 20b, 21b, 22b).

(18) /i/ and /ɪ/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Open Syllable				
[si̲.ŋə]	*singen*	‘to sing’	[ʃvɪ̲.mə]	*Schwimmen*	‘swimming’
[ti̲.tl̩]	*Titel*	‘title’	[tɪ̲.ʃl̩]	*Tisch* (DIM.)	‘table’
b.	Closed Syllable				
[vi̲n]	*Wien*	‘Vienna’	[ʀɪ̲ŋ]	*Ring*	‘ring’
[li̲kt]	*liegt* (3.SG.)	‘to lie’	[gɪ̲pt]	*gibt* (3.SG.)	‘to give’

(19) /e/ and /ɛ/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a.	Open Syllable				
[ʀe̲.gl̩]	*Regel*	‘rule’	[sɛ̲.sl̩]	*Sessel*	‘armchair’
[ʃpe̲.tɐ]	*später*	‘later’	[ʃvɛ̲.stɐ]	*Schwester*	‘sister’
b.	Closed Syllable				
[ge̲m]	*geben* (INF.)	‘to give’	[vɛ̲n]	*wenn*	‘when’
[kle̲kt]	*gelegt* (PP.)	‘laid’	[flɛ̲k]	*Fleck*	‘fleck’

(20) /u/ and /ʊ/

RG	SG	Eng.	RG	SG	Eng.
a. Open Syllable					
[tsu̲.kɐ]	*Zucker*	‘sugar’	[ʃlʊ̲.kn̩]	*schlucken* (INF.)	‘to swallow’
[blu̲.mə]	*Blume*	‘flower’	[mʊ̲.tɐ]	*Mutter*	‘mother’
b. Closed Syllable					
[tsu̲k]	*Zug*	‘train’	[ʃʊ̲ts]	*Schutz*	‘protection’
[bə.ʀu̲f]	*Beruf*	‘occupation’	[mʊ̲s]	*muss* (1.SG.)	‘must’

(21) /o/ and /ɔ/

RG	SG	Eng.	RG	SG	Eng.
a. Open Syllable					
[mo̲.lɐ]	*Maler*	‘painter’	[pɔ̲.siɐ̯t]	*passiert* (PP.)	‘to happen’
b. Closed Syllable					
[flo̲t]	*flott*	‘brisk’	[glɔ̲t]	*glatt*	‘smooth’
[mo̲xt]	*macht* (3.SG.)	‘to do’	[gɔ̲nts]	*ganz*	‘all’

(22) /a/ and /o/

RG	SG	Eng.	RG	SG	Eng.
a. Open Syllable					
[gla̲.fm̩]	*gelaufen* (PP.)	‘to run’	[ʃlo̲.fm̩]	*schlafen* (INF.)	‘to sleep’
[ka̲.fe]	*Kaffee*	‘coffee’	[tʀo̲.fe]	*Trophäe*	‘trophy’
b. Closed Syllable					
[ba̲m]	*Baum*	‘tree’	[bo̲n]	*Boden*	‘ground’
[ka̲ft]	*kauft* (3.SG.)	‘to buy’	[ko̲pf]	*Kopf*	‘head’

The contrast between schwa (/ə/) and /ɛ/ is given in (23).

(23) /ə/ and /ɛ/

RG	SG	Eng.	RG	SG	Eng.
[bə̲.ˈʀuf]	*Beruf*	‘occupation’	[hɛ̲.ˈʀʊm]	*herum*	‘around’
[ˈku.ʃə̲.lɪk]	*kuschelig*	‘cuddly’	[ˈtsu.fɛ̲.lɪk]	*zufällig*	‘accidental’

As in SG, although schwa is a phoneme, it only occurs in unstressed syllables; stress is marked in the data in (23) with the IPA diacritic ‘ˈ’. For literature and analyses of SG schwa, see Moulton (1956, 1962), Ungeheuer (1969), Bach & King (1970), Wurzel (1970), Kufner (1971), Kloeke (1982), Strauss (1982), Wiese (1986, 1988, 1996), and Hall (1992a).[18] There is agreement that schwa cannot be derived from a full vowel by a rule of vowel reduction. Examples like *Schrank* [ʃʀaŋk] vs. *Schranke* [ʃʀaŋ.kə] ‘cabinet(s)’ show a contrast between schwa and zero; these examples are important because they tell us that not every surface schwa can be the result of Schwa Epenthesis. This holds for RG as well.

The SG front rounded vowels /y ʏ ø œ/, which are written orthographically with umlauts as <ü> and <ö> do not occur in BG.[19] If pressed into formal speech, speakers of BG might give front rounded “standard” forms, but this is rare and never in dialect speech. Zehetner (1985:54-55) and Merkle (2005:15) call BG realization of SG umlauted vowels *Entrundung* – ‘unrounding’.[20] This process of unrounding was historical, and thus a vowel such as [i] in (24a) is not synchronically derived from /y/. Data showing SG umlauted vowels, which underwent historical unrounding in BG, are given in (24).

[18] In SG, there are alternations between schwa and zero in pairs like *Wandel* ~ *Wandlung* ‘change ~ transformation’, which are analyzed in some of the literature cited above with a rule of Schwa Epenthesis; similarly, in RG a word like *Wandel* is pronounced with a syllabic /l/ as [vɔn.dl̩], so there is an alternation between a syllabic sonorant and a non-syllabic sonorant. Data concerning syllabic liquids will be discussed in section 5.4.1.

[19] SG umlauted vowels are underlyingly contrastive in terms of tenseness, so orthographic <ü> is realized as either [y] or [ʏ], and <ö> as [ø] or [œ].

[20] “Unter »Entrundung« versteht man die Erscheinung, daß ein an sich rund, das heißt mit gerundeten Lippen, zu sprechender Vokal ungerundet – mit breitgezogenem Munde – gesprochen wird. Diese Entrundung ist fürs Bairische schon seit dem 13. Jahrhundert nachgewiesen. Sie macht aus dem *ö* ein *e* oder, noch ungerundeter, ein *ä* … aus dem *ü* ein *i* … aus dem *eu (äu)* ein *ei* …” (Merkle 2005:15) “By ‘unrounding’, one understands the phenomenon that a round vowel, that is, a vowel spoken with rounded lips, is spoken as unrounded – with spread lips. This unrounding has been evidenced in Bavarian since the 13th century. It makes an *e* out of *ö*, or even more unrounded, an *ä* … an *i* out of *ü* … an *ei* out of *eu (äu)* …”

(24) Umlauted Vowels

	Ramsau German	Standard German	English
a.	<ü>		
	[fli.gl̩]	*Flügel*	'wing'
	[mɪ.sn̩]	*müssen* (INF.)	'must'
b.	<ö>		
	[ke.nə]	*können* (INF.)	'can'
	[kɛn]	*gehören* (INF.)	'to belong to'
c.	<äu>		
	[haɪ̯.sl̩]	*Häusl* (DIM.)	'little house'

As can be seen in (24), SG high front <ü> is RG high front unrounded [i] or [ɪ], mid front <ö> is a mid front unrounded [e] or [ɛ], and SG <äu> ([ɔɪ̯]) is [aɪ̯]. Some SG umlauted vowels are realized as back vowels; for example, the <ü> in *Brücke* 'bridge' is pronounced as [ʊ].[21]

RG also has two types of allophonic monophthongs, which can be seen in (25). The first kind of allophonic monophthong is nasalized: each oral vowel in the vowel chart in (17) corresponds to a nasalized allophone in (25a). RG does not have phonemic nasal vowels; rather, these are produced through an assimilatory rule discussed in chapter 4. The other type of allophonic monophthong concerns length, as indicated in (25b). RG monophthongs are not underlyingly distinctive for length; however, a rule of Compensatory Lengthening discussed in chapter 6 creates the long allophones in (25b).

[21] Merkle (2005:16) notes that in Upper German, certain consonant clusters blocked historic umlaut, and this is why some back vowels in BG correspond to front rounded vowels in SG.

(25) RG Allophonic Monophthongs

a. Nasalized Allophones

	FRONT			BACK	
HIGH	ĩ	ɪ̃		ʊ̃	ũ
MID	ẽ	ɛ̃	ə̃	ɔ̃	õ
LOW			ã		

b. Long Vowels

	FRONT			BACK	
HIGH	iː	ɪː		ʊː	uː
MID	eː	ɛː	əː	ɔː	oː
LOW			aː		

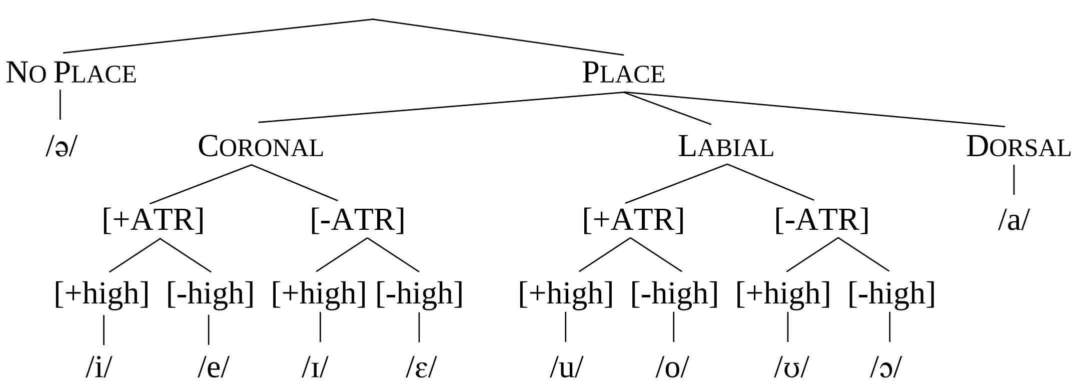
The next section presents distinctive features for the RG vowels given above.

3.3.2 Distinctive Features of RG Vowels

As with the consonants in section 3.2.2, I follow Dresher's (2009) framework for determining features with a contrastive hierarchy by employing the SDA. All vowels are [+sonorant] and [-consonantal], and they are distinguished by their PLACE features (CORONAL, DORSAL, and LABIAL), as well as feature values for height ([+/-high]) and tenseness ([+/-ATR]). The feature hierarchy for RG vowels is given in (26).

(26) Hierarchy for Contrastive Features of RG Vowels:

PLACE > CORONAL, LABIAL, DORSAL > [ATR] > [high]



It can be observed that /a/ is different from all other RG phonemic vowels because it is specified as DORSAL and has no specification for [ATR] or [high]. Because place features are ranked higher than [ATR] and [high], these features are not distinctive for /a/.

In (27), I present feature matrices for the RG phonemic monophthongs. From the phonological perspective, /i/ and /ɪ/ differ in terms of a segmental feature for tenseness, and not length. The same holds for the pairs /e/ and /ɛ/, /u/ and /ʊ/, /o/ and /ɔ/. I employ the distinctive feature [ATR] for such pairs. For discussion of whether tenseness or length is distinctive in SG, see Wurzel (1980, 1981), Kloeke (1982:3-10), Giegerich (1985), Yu (1992), Wiese (1996), and Becker (1998).

(27) Distinctive Features of RG Monophthongs

	/i/	/ɪ/	/e/	/ɛ/	/a/	/o/	/ɔ/	/u/	/ʊ/	/ə/
[sonorant]	+	+	+	+	+	+	+	+	+	+
[consonantal]	–	–	–	–	–	–	–	–	–	–
PLACE	✓	✓	✓	✓	✓	✓	✓	✓	✓	
[high]	+	+	–	–		–	–	+	+	
CORONAL	✓	✓	✓	✓						
LABIAL						✓	✓	✓	✓	
DORSAL					✓					
ATR	+	–	+	–		+	–	+	–	

As noted above, RG underlying vowels do not contrast for length, although there are indeed surface long vowels, which are derived and not underlying (recall (25b)). I account for these long vowels in chapter 6 with X theory (Levin 1985, Lowenstamm & Kaye 1986, Hayes 1989), where a long vowel will receive two length units (X slots). I do not assign specific distinctive features for length in this chapter; instead I consider that each segment has an underlying X slot.

I am following the proposal made by other linguists that schwa (/ə/) is not specified for place features. For similar analyses of segments lacking features or being ‘empty’ in various languages, see Anderson (1982) for French, Clements & Keyser (1983) for Turkish, Marlett & Stemberger (1983) for Seri, Keyser & Kiparsky (1984) for Finnish, Kenstowicz & Rubach (1987) for Slovak, Vago (1989) for Hungarian, and Szpyra (1992) for Polish; for a discussion of placeless schwa in SG, see Wiese (1996:153); see also van Oostendorp (2000:134) for an analysis where schwa in Dutch is placeless. This also follows argumentation in Dresher (2009:164), who shows that when there is a front, back, and central vowel in a language, the front and back vowels are marked with place specifications, while there is no [central] feature; thus /ə/ would be unmarked. For more discussion on this, see Rose (1993), Walker (1993), and Rice (2007). Analyzing schwa with no place features enables me to analyze the feature [low] as redundant, and it is thus not given in the feature matrices in (27). In a fully-specified system, /a/ would be DORSAL, [+low], and schwa would be DORSAL, [-low]. Since schwa is placeless, I can analyze the difference between /a/ and schwa in terms of the presence versus the absence of place (as shown in the contrastive feature hierarchy in (26)).

On the basis of the hierarchy in (26), the vowel /a/ is not marked for the feature [ATR]. Because /a/ is the only underlying DORSAL vowel in RG, tenseness is irrelevant for /a/; that is, [ATR] is only distinctive for CORONAL and LABIAL vowels. As discussed in chapter 1, front vowels are represented with a CORONAL node under PLACE, as in (28a) (cf. Pulleyblank 1988, Hume 1992, Rice 1995, and other sources cited in chapter 1). Back vowels are analyzed with either a DORSAL node under PLACE, as in (28b), or a LABIAL node, as in (28c). There are no front rounded vowels in RG, so all vowels which have the feature LABIAL are back. These representations are shown to work optimally for RG throughout the dissertation, particularly in the treatment of RG Umlaut in section 3.4.3.

(28) Feature Representations of Vowels

a. Front Vowels	b. Back Low Vowel	c. Back Non-low Vowels
$\begin{bmatrix}\text{+son}\\ \text{-cons}\end{bmatrix}$	$\begin{bmatrix}\text{+son}\\ \text{-cons}\end{bmatrix}$	$\begin{bmatrix}\text{+son}\\ \text{-cons}\end{bmatrix}$
|	|	|
PLACE	PLACE	PLACE
|	|	|
CORONAL	DORSAL	LABIAL

The way in which RG vowels are analyzed here in terms of place features does not capture the natural class of back vowels, that is, non-coronal vowels. However, if it were necessary to capture back vowels, the feature PERIPHERAL (Rice 1994) could be used, since it dominates both LABIAL and DORSAL and is a sister of CORONAL. In the present dissertation, no rules refer to this natural class, and therefore, it is not used in the feature representations and rules.

As discussed in chapter 1, when using a contrastive feature hierarchy, features are not ‘underspecified’, and therefore default rules do not assign features to vowels. For example, the feature [low] is not added by default to /a/; nor is [ATR] assigned to /a/ or schwa. Thus, the feature specifications of /a/ are the same as those for [a]. Moreover, DORSAL is not added as a daughter of PLACE to the back non-low vowels /o ɔ u ʊ/, which are specified with the feature LABIAL.

3.3.3 RG Diphthongs

I define a diphthong as a syllabic vowel plus a following tautosyllabic glide. There are three underlying diphthongs in RG: /aɪ/, /aʊ/, and /ɔɪ/. These diphthongs are phonemic because they contrast with each other and with all of the monophthongs presented above and are therefore not derived via rules. The diphthongs in (29) are arranged according to the quality of the first component.

(29) RG Phonemic Diphthongs

	FRONT	BACK
HIGH		
MID		ɔɪ̯
LOW	aɪ̯	aʊ̯

RG also has derived diphthongs which, by definition, are not phonemic; these are given in (30) and, like the diphthongs in (29), they are organized by the quality of the syllabic part. These diphthongs are derived either from monophthongs or from sequences of vowel plus liquid. The rules creating the diphthongs in (30) are Diphthongization (discussed in section 3.4.1) and Liquid Vocalization (see chapter 5).

(30) RG Derived Diphthongs

	FRONT			BACK	
HIGH	iə̯ iɐ̯	ɪɐ̯		ʊɐ̯	uʊ̯ uɐ̯ uɪ̯
MID	eə̯ eɐ̯ eɪ̯	ɛɐ̯ ɛɪ̯		ɔɐ̯ ɔɪ̯	oʊ̯ oɐ̯
LOW			aɐ		

The phonemic diphthongs /aɪ/ and /aʊ/ contrast in open syllables in (31a) and in closed syllables in (31b).

(31) /aɪ/ and /aʊ/

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
a. Open Syllables					
[haɪ̯]	*Hai*	‘shark’	[fʀaʊ̯]	*Frau*	‘woman’
[laɪ̯.dɐ]	*leider*	‘unfortunately’	[faʊ̯.lɐ]	*(ein) Fauler*	‘lazy guy’
b. Closed Syllables					
[fʀaɪ̯t]	*Freude*	‘joy’	[haʊ̯s]	*Haus*	‘house’
[ʀaɪ̯ç]	*Reich*	‘kingdom’	[paʊ̯l]	*Paul*	‘Paul’

Some phonologists argue that diphthongs in certain languages are derived from monophthongs. For example, van Oostendorp (2000:78) gives an analysis for Dutch vowels where the diphthongs [ɛi], [œy], [ɒu], which all have a lax vowel as the first component, are derived from short high lax vowels. Van Oostendorp shows that there are no surface high lax vowels in Dutch; thus there is no contrast between a high lax vowel and [ɛi], [œy], [ɒu]. The RG phonemic diphthongs in (29) cannot be derived from monophthongs, however, because they contrast with all monophthongs. Representative data are given in (32), where /a/ contrasts with /aɪ/ in (32a), and /u/ contrasts with /aʊ/ in (32b).

(32) Diphthongs and Monophthongs

RG	SG	Eng.	RG	SG	Eng.
a. /a/ and /aɪ/					
[kla.viɐ̯]	*Klavier*	‘piano’	[laɪ̯.dɐ]	*leider*	‘unfortunately’
[glas]	*Glas*	‘glass’	[ʁaɪ̯ç]	*Reich*	‘kingdom’
b. /u/ and /aʊ/					
[tsu.kɐ]	*Zucker*	‘sugar’	[faʊ̯.lɐ]	*(ein) Fauler*	‘lazy guy’
[flus]	*Fluss*	‘river’	[haʊ̯s]	*Haus*	‘house’

Data showing phonemic /ɔɪ/ contrasting with /aɪ/ are given in (33).

(33) /ɔɪ/ and /aɪ/

RG	SG	Eng.	RG	SG	Eng.
[e.fɔɪ̯]	*Efeu*	‘ivy’	[haɪ̯]	*Hai*	‘shark’
[ɔɪ̯.lə]	*Eule*	‘owl’	[haɪ̯.lɐ]	*Heiler*	‘healer’

Underlying /ɔɪ/ does not surface frequently in the dialect, though in certain words, like those in (33), it always surfaces. Put differently, /ɔɪ/ has a low “Functional Load” (Mathesius 1929, Jakobson 1931, Trubetzkoy 1939); i.e. RG does not make great use of the contrast of /ɔɪ/ with other vowels. As the focus of the present study is not on phoneme frequency, Functional Load will not be further discussed. The interested reader is referred to Hockett (1955), King (1967), and Wang (1967), and more recently Surendran & Niyogi (2003) and Surendran & Levow (2004), who discuss methods for measuring a language’s Functional Load.

Many instances of SG /ɔɪ/ are /aɪ/ in BG, and Merkle (2005:15) includes these in his definition of ‘unrounding’ (see discussion in section 3.3.1). For example, SG *Freude* [fʁɔɪ̯.də] is RG [fʁaɪ̯t], and SG *Leute* [lɔɪ̯.tə] is RG [laɪ̯t]. This produces a merger of a contrast with SG /aɪ/ and /ɔɪ/ in words like *Hai* and *Heu*, which are both pronounced as [haɪ̯] in RG.[22]

In my analysis, I capture the structure of diphthongs in terms of features and syllables (nuclei). Representations of the three RG phonemic diphthongs are given in (34), where 'N' represents the syllable nucleus. I provide complete representations with features for the segments dominated by the nucleus node below.

(34) Underlying Diphthongs

a.	/aɪ/:	b.	/aʊ/	c.	/ɔɪ/:
	N		N		N
	a ɪ		a ʊ		ɔ ɪ

I adopt the view that both parts of underlying diphthongs belong to the same nucleus.[23] A number of models of syllable structure have been proposed which capture my 'nucleus' node in different ways (e.g. Hayes 1989 for moraic phonology, Clements 1985, Selkirk 1990, Blevins 1995; see also Wiese 1996:39 for the approach in (34) used for SG and Kostakis 2015:279 for earlier stages of German). The choice of which of these models is correct for RG is a question which exceeds the goals of this dissertation.

I also adopt the view that the diphthongs in (34) have underlying peaks; i.e. the nucleus in (underlying) diphthongs is underlyingly present (see Levin 1985, Guerssel 1986, and Harris & Kaisse 1999 for discussion of underlying peaks). When there is no underlying peak, the nucleus (as well as the onset and coda) is assigned by Syllabification:

[22] This merger was historical and not synchronic.
[23] Derived diphthongs have either the structure in (34) (see section 3.4.1), or may be realized with the second component in the coda (see chapter 5).

(35) Syllabification (adapted from Kenstowicz 1994:253-4)

a. Parse [-consonantal] segments in the nucleus.

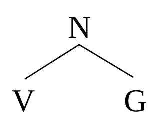
b. Create onsets.

c. Create codas.

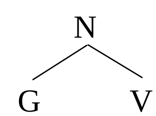
In RG underlying (as well as derived) diphthongs, it is always the first vowel which is syllabic, and the second element is the glide, i.e. RG allows offglides but does not allow onglides. Therefore, diphthongs in RG are falling, as in (36a), and not rising, as in (36b).[24]

(36) Falling and Rising Diphthongs

a.



b.



The glide portion of the diphthongs is indicated in the phonetic representation with the IPA diacritic, e.g. [aɪ̯], [aʊ̯], [ɔɪ̯].

Each segment in the diphthongs has its own root node as well as its own set of place features. The diphthong /aɪ/, for example, is comprised of the features for /a/ next to those for /ɪ/; the former segment is [+sonorant, -consonantal, DORSAL], and the latter segment is [+sonorant, -consonantal, CORONAL]. Since there is no contrast between /aɪ/ and a diphthong such as */aɛ/, the only place feature needed for the second element when it is /ɪ/ is CORONAL; [high] is redundant. That is, because there is no contrast between a high

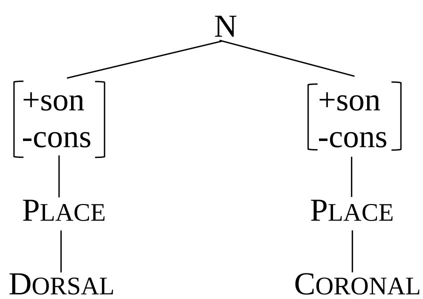
[24] Sequences of GV created by Glide Formation, where the glide is in an onset and does not share a nucleus with the syllabic vowel, will be discussed in section 3.4.5.

coronal and a coronal at another height, the /ɪ/ in the diphthong /aɪ/ is not distinctive for [high]. In contrast, the monophthong /ɪ/ must bear the feature [+high] because it contrasts with /ɛ/. The same point holds for [ATR] because there is no contrast between /ai/ with a tense /i/ and /aɪ/ with a lax /ɪ/. The situation is similar for diphthongs like /aʊ/, where the second element is /ʊ/: that vowel is marked for neither [high] nor [ATR] because there is no diphthong */aɔ/ nor contrasting */au/.

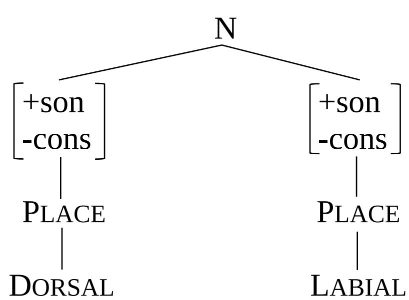
The main difference between Coronal monophthongs and the /ɪ/ component of the diphthongs and between Labial monophthongs and the /ʊ/ component of diphthongs is that the Coronal and Labial monophthongs have feature values for both [high] and [ATR], while the /ɪ/ and /ʊ/ segments in diphthongs do not. Compare, for example, the featural representations for diphthongs in (37) and the distinctive features for the RG monophthongs in (27) (see section 3.3.2).

(37) Featural Representations of RG Diphthongs

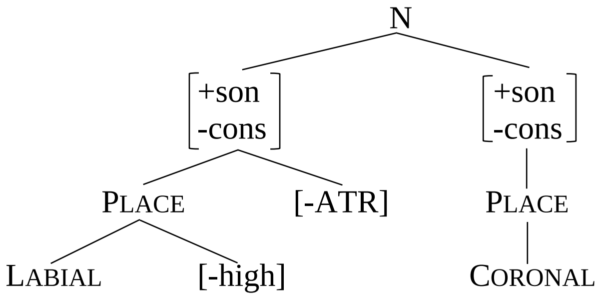
a. /aɪ/:



b. /aʊ/:



c. /ɔɪ/:



Analyzing the non-syllabic element of diphthongs in this way also reflects phonetic variation in the data. For example, the diphthong /aɪ/ in the word *Reich* ‘kingdom’ may be pronounced as [aɪ̯] (where the offglide is high front lax) in one utterance and then as [ai̯] (with the tense high front offglide) in the next. This small variation of the diphthong does not change meaning or cause any issues of comprehension for listeners. There is only one non-syllabic front vowel option for diphthongs, so it is not important to state other phonological features of this vowel, since they vary with each utterance but still maintain their distinguishing feature CORONAL.

While analyzing diphthongs with two root nodes is common in the literature (cf. Clements 1985 and Selkirk 1990), the features I adopt to represent the non-syllabic elements are not. Under traditional analyses, each root of a diphthong is comprised of the same features as the corresponding monophthong. For example, the [ɪ̯] in the diphthong /aɪ/ is the same featurally as the monophthong /ɪ/. See, for example Wiese (1996) and Kostakis (2015:279). My analysis, where the non-syllabic segments of diphthongs are minimally specified in terms of features (that is, [ɪ̯], for example, is only specified for the feature CORONAL, and not also for [ATR] and [high]), reflects not only notions of phonological contrast, but also phonetic variation and production. Along these lines, Wiese

(1996:159-160) states: “In general, non-syllabic vowels are often articulated such that the target values of the articulatory features are not as fully and clearly realized as they are in syllabic vowels.”

One last note about the difference between SG diphthongs and those in RG concerns the SG diphthong /aʊ/. Many words with /aʊ/ in SG are realized with /a/ in RG. For example, the word *Baum* ‘tree’ is pronounced as [bam] in RG. Additional data are given in (38).

(38) RG /aʊ/ > /a/

Ramsau German	**Standard German**	**English**
[bam]	*Baum*	‘tree’
[kaft]	*kauft* (3.SG.)	‘to buy’
[af]	*auf*	‘on’

At some point, BG underwent a monophthongization of /aʊ/ > /a/. Because there is not a clear context for when SG /aʊ/ is realized as /a/ in BG, I argue that this was a sound change not reflected in a synchronic rule and will not discuss it further. See Merkle (2005:14 §10) for more on this.

3.4 RG Phonological Processes

In this section, I discuss several common phonological processes in RG. In each subsection, I present illustrative data for the process and give an analysis in terms of the features and Feature Geometry discussed in previous sections. While two of the six processes (Dorsal Fricative Assimilation in 3.4.2 and Umlaut in 3.4.3) are frequently analyzed in the literature on SG, the RG facts are different and thus require unique analyses. I will show how these processes can be analyzed with the features given above for the phonology of RG. The rules discussed here produce outputs that are transparent on the surface. Thus, none of the data discussed below illustrate opacity.

3.4.1 Diphthongization

RG has a process of Diphthongization which four vowels can undergo:

(39) Diphthongization

/i/	→	[iə̯]
/e/	→	[eə̯]
/u/	→	[uʊ̯]
/o/	→	[oʊ̯]

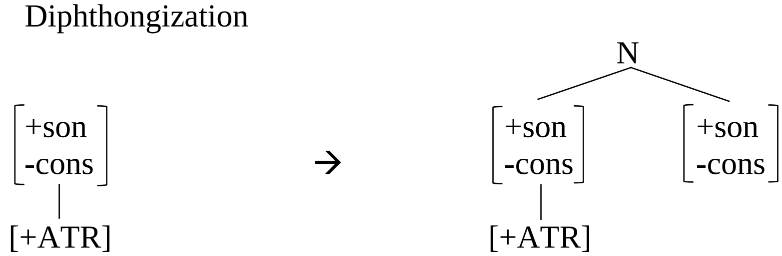
The input to Diphthongization is any one of the four phonemic tense vowels. After the front vowels /i e/, the second part of the diphthong is schwa, but it is back [ʊ̯] after /u o/. The rule is motivated by the optional realization of the monophthongs /i e u o/ as diphthongs, as in (40). For example, the word *wie* in (40a) surfaces as either [i] or [iə̯]. In most such RG words, there is frequent variation in vowels; that is, sometimes a given word will surface with a diphthong, and other times, it surfaces with the monophthong. Data showing such variation with all four tense, non-low monophthongs and respective diphthongs are given in (40), where (40a) shows [i] ~ [iə̯], (40b) [e] ~ [eə̯], (40c) [u] ~ [uʊ̯], and (40d) [o] ~ [oʊ̯].

(40) Diphthongization – Variation in Application

	Ramsau German	**Standard German**	**English**
a.	[vi] ~ [viə̯]	*wie*	‘how’
b.	[vek] ~ [veə̯k]	*Weg*	‘path’
c.	[tsu] ~ [tsuʊ̯]	*zu*	‘to’
	[ksuxt] ~ [ksuʊ̯xt]	*gesucht* (PP.)	‘to seek’
	[fus.bɔɪ̯] ~ [fuʊ̯s]	*Fußball* ~ *Fuß*	‘football ~ foot’
d.	[fʀokt] ~ [fʀoʊ̯ŋ]	*fragt* (3. SG.) ~ *fragen* (INF.)	‘to ask’
	[tok] ~ [toʊ̯k]	*Tag*	‘day’
	[vo.sɐ] ~ [voʊ̯.sɐ]	*Wasser*	‘water’
	[ʃlo.fm̩] ~ [ʃloʊ̯.fm̩]	*schlafen* (INF.)	‘to sleep’
	[do] ~ [doʊ̯]	*da*	‘there’

In (40), each of the underlying vowels is a tense, non-low monophthong, which is optionally realized on the surface with a following non-syllabic vowel. The four diphthongs in (40) are the output of the process of Diphthongization (see (41)), where a single vocalic root node (monophthong) is produced on the surface with two adjacent vocalic root nodes (diphthong).

(41) Diphthongization

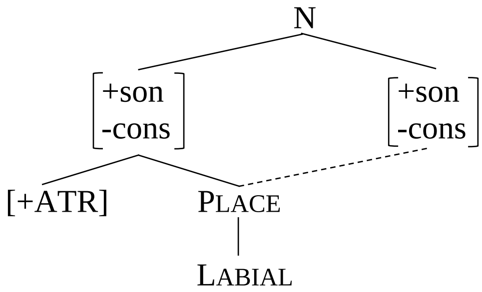


Diphthongization states that a tense vowel is produced with two root nodes within the same nucleus, where the second root is schwa. In this rule, the input vowel is [+ATR], since the four vowels which undergo Diphthongization are all specified as [+ATR]: /i, e, u, o/. As shown in the feature matrices in (27), the only RG monophthong not specified for [ATR] is [a], which does not undergo Diphthongization. Thus, these features predict that /a/ should not behave phonologically with other vowels with respect to tenseness; the process of Diphthongization shows that this prediction is correct. I analyze these four diphthongs as having a complex nucleus because there is a restriction within the nucleus that only tense vowels undergo Diphthongization. In chapter 5, however, I show diphthongs derived from vowel plus liquid sequences, which have a different syllable structure. For discussion on the syllable structure of diphthongs and constituency, see Booij (1989), Yip (2003), and chapter 5.

As noted above, diphthongs in RG are always falling: the first element is syllabic, while the second is a glide (cf. (36a)). Syllabification of diphthongs derived via Diphthongization adhere to this generalization, i.e. the glide is always the second vowel within the nucleus and never the first. Thus, the schwa produced via Diphthongization in (40a,b) is not syllabic, while the underlying tense vowel is. The same holds for the glide [ʊ̯] in (40c,d), which is non-syllabic, while underlying [u] and [o] are.

The data in (40a,b) illustrate that the second part of the derived diphthongs surfaces as schwa if the input monophthong is /i/ or /e/. By contrast, the second part of the derived diphthongs is a rounded vowel if the input monophthong is /u/ or /o/. Recall the examples in (40c,d). I account for this difference with a rule of Labial Assimilation in (42), which states that when the syllabic element of a diphthong is labial, and the non-syllabic element is unspecified for place (i.e. schwa), PLACE spreads to the non-syllabic segment, producing a rounded vowel ([ʊ̯]).

(42) Labial Assimilation

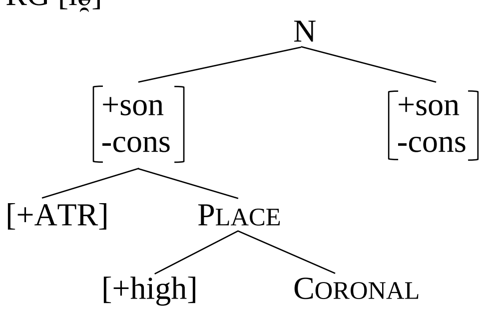


As stated in (42), Labial Assimilation only spreads LABIAL to a vowel not marked for place features (i.e. schwa). Given that requirement, LABIAL cannot spread from /ɔ/ to /ɪ/ in the underlying diphthong /ɔɪ/.

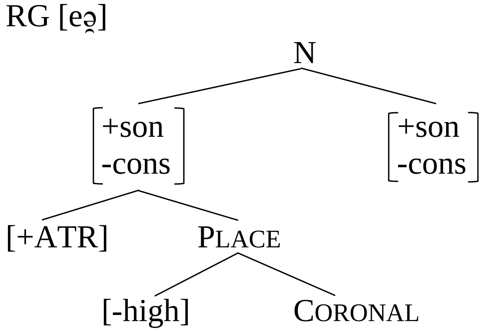
Featural representations for diphthongs derived via Diphthongization are given in (43).

(43) Derived Diphthongs

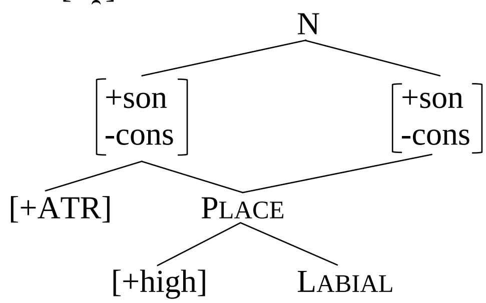
a. RG [iə̯]



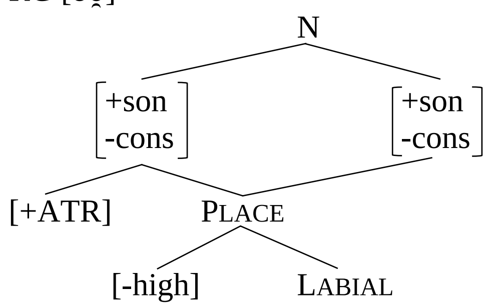
b. RG [eə̯]



c. RG [uʊ̯]



d. RG [oʊ̯]



When schwa is the non-syllabic segment of a diphthong in (43a,b), its features remain [+sonorant, -consonantal] because schwa never has place features (cf. Wiese 1996, van Oostendorp 2000; see section 3.3.2 for more literature on schwa). In (43c,d), both [-consonantal] segments share place (via Labial Assimilation). While the syllabic vowel in each of these diphthongs is specified for the feature [high], this feature is irrelevant for the non-syllabic segment ([ʊ̯]), as was discussed concerning phonemic diphthongs.

Diphthongization in (41) and Labial Assimilation in (42) are context-free (and optional). They apply in closed and open syllables word-internally and word-finally, and before consonants with different manners and places of articulation. I speculate that variation is determined by some socio-linguistic variable, although this is a question which I ultimately leave open for further research.[25]

I did, however, observe that Diphthongization was more likely in my speakers when certain non-phonological conditions were met; as with any fieldwork, other linguistic factors came into play. For example, in quicker speech, subjects were less likely to produce the words in (40) with the diphthong version; i.e., in these instances, the monophthong surfaced. In addition to this, when a word received sentence-level stress, such as the subject or main verb, speakers often produced the words with the diphthong version. Finally, in sentences when speakers paused on a particular word, either for interpretation's sake or because they were contemplating how to pronounce a word or articulate a certain idea later in the sentence, the words were elongated, and an elongated underlying tense vowel frequently surfaces as a diphthong.

The data given in the rest of this dissertation generally reflect the underlying monophthongs, not the diphthongs created by Diphthongization. However, if a specific word is only realized in the data with the diphthong version (for reasons as yet unknown), a monophthong form will not be provided; rather, I will give the diphthong form.

It appears that Diphthongization may be more prevalent in Bavarian German regions north of where these data were collected (i.e. Central Bavarian), as grammars which focus more on dialect spoken in Bavaria do not distinguish between all phonemic and allophonic diphthongs. It is possible that other diphthongs, aside from the three I have discussed for Styria, could be phonemic in Bavaria. For example, Merkle (2005:13) states

[25] Some evidence suggests that the tense monophthongs in certain words idiosyncratically fail to undergo Diphthongization. For example, the word *Spieler* 'player' is only pronounced [ʃpi.lɐ] for my speakers; I assume that this is a lexical exception.

that there are eleven diphthongs, while Zehetner (1985:54, 79) states that there are 24 attested BG diphthongs with three historical origins: OHG/MHG diphthongs, diphthongization of long monophthongs, and liquid vocalizations. It is not clear to me whether or not diphthongs behave differently in Bavaria than they do in Styria, and as the majority of data given for this study are from Styria, I will only make strong claims concerning the status of these diphthongs in Styria. See the conclusion for further discussion of variation concerning diphthongs and Diphthongization.

3.4.2 Dorsal Fricative Assimilation and Debuccalization

There is much discussion in the literature on Dorsal Fricative Assimilation (DFA) in SG, which accounts for the distribution of [x] and [ç]; see, for example, Wurzel (1970), Kloeke (1982), Jessen (1988), Hall (1989, 1992b), Yu (1992), Wiese (1996), Robinson (2001), and Glover (2014).

Data which show the distribution of the RG fricatives [x] and [ç] are presented in (44). It can be observed that [x] occurs after back vowels in (44a) and [ç] after front vowels in (44b).

(44)	[x] and [ç][26]		
	Ramsau German	**Standard German**	**English**
a.	[x] after back vowels		
	[ksuxt]	*gesucht* (PP.)	‘to seek’
	[ɔ̃.fʊx]	*einfach*	‘simply’
	[vo.xn̩]	*Woche*	‘week’
	[sa.xɛ]	*Sache*	‘matter’
	[nɔx]	*nach*	‘after’
	[ə haʊ̯.xl̩]	*ein Hauchl*	‘hint’

[26] I do not have data for the phoneme /x/ after the vowels /ɔ/, /ɛ/, or /ɔɪ/; these are accidental gaps. The expectation is that /x/ surfaces as [x] after /ɔ/ and as [ç] after /ɛ/ and /ɔɪ/.

b.	[ç] after front vowels		
	[si.çɐ]	*sicher*	'sure'
	[pflɪçt]	*Pflicht*	'duty'
	[ʀeç]	*Reh*	'deer'
	[ʀaɪ̯ç]	*Reich*	'kingdom'

RG [x] and [ç] are in complementary distribution and therefore never contrast. As in SG, [x] occurs after back vowels (including diphthongs whose second member is back, i.e. [buʊ̯x] *Buch*), and [ç] occurs after front vowels (including diphthongs which end in a CORONAL offglide, i.e. [ʀaɪ̯ç] *Reich*).[27]

In Styria, many morphemes which end in <h> in SG are pronounced with an allophone of the dorsal fricative /x/. That is, a coda <h> which is silent in SG is pronounced in RG. For example, the word *Schuh* 'shoe' is pronounced as [ʃuː] in SG but ends in a dorsal fricative in RG: [ʃuʊ̯x]. See (45) for another example.[28, 29]

(45) Pronunciation of Orthographic <h>

RG	SG	SG Orthography	English
[fiç]	[fi]	*Vieh*	'cattle'

Unlike SG, RG does not have a rule of G-Spirantization (see Hall 1992b:228 and Wiese 1996:206), whereby underlying /g/ surfaces with the palatal fricative [ç] in the suffix *-ig*. Instead, RG *-ig* is produced as [ɪk]. The suffix *-lich*, on the other hand, is pronounced

[27] In Southern German (including BG), there are no words beginning with the dorsal fricative (e.g. the <ch> in words like *China* are pronounced [k]); see Wiese (1996:210). There is also no BG diminutive suffix *-chen*, which begins with [ç] in SG; instead, the diminutive suffix is syllabic /l/ [l̩] (Zehetner 1985, Wiesinger 1990:462-3, and Merkle 2005).

[28] This pronunciation of orthographic <h> as [x] or [ç] is inherited from <h> in Middle High German (MHG), e.g. MHG *vihe* for SG *Vieh*. In MHG, the <h> in examples like these was a dorsal fricative.

[29] The data I collected in Bavaria do not show this to be the case; instead, speakers of DG produce these forms as in SG. For example, the word *Schuhe* in DG is pronounced [ʃu.ə], and *Vieh* is [fi].

in RG with the palatal fricative [ç], as in the word *erstaunlich*. Examples can be seen in (46).

(46) *-ig* and *-lich*[30]

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
[eɐ̯.ʃtaʊ̯n.lɪç]	*erstaunlich*	'astonishing'	[se.lɪk̲]	*selig*	'blessed'

I present features for the velar and palatal fricatives in (47). The palatal fricative is marked as both CORONAL and DORSAL, while the velar fricative is only specified as DORSAL. I am adopting representations for palatals as complex segments proposed by Robinson 2001 (and other authors referred to therein). In chapter 4, I give an argument against analyzing the palatal fricative as a simplex coronal sound.

(47) Features of /x/ and [ç]

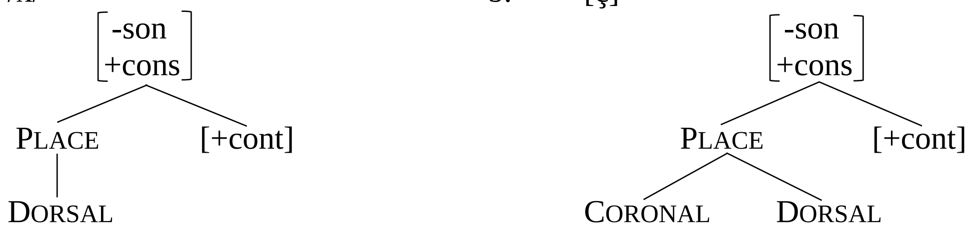
	/x/	[ç]
[sonorant]	–	–
[consonantal]	+	+
[continuant]	+	+
PLACE	✓	✓
CORONAL		✓
DORSAL	✓	✓

Non-linear representations for the fricatives in (47) are given in (48). In (48a), [x] is shown with a DORSAL node as the daughter of PLACE. In (48b), the segment [ç] can be observed to have a complex place specification with DORSAL and CORONAL as daughters of PLACE.

[30] The word-final [k] in *selig* derives from /g/ because there are alternants with [g], such as *selige* [se.lɪ.gə]. This alternation is due to Final Devoicing (see section 3.4.4). The /g/ in all instances of word-final RG –*ig* is pronounced as [k]; *selig* is a representative example. In contrast, the [ç] in *erstaunlich* does not change if there is a vowel-initial suffix. For more discussion of these suffixes, see Merkle 2005:28 §23.

(48) RG /x/ and [ç]

a. /x/ b. [ç]



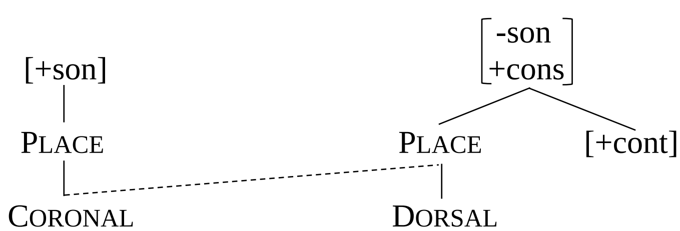
A linear rule of DFA is given in (49a), which states that the dorsal fricative /x/ is realized as palatal when it follows a sonorant segment marked as CORONAL. That DFA is a rule of assimilation is shown in the feature geometric rule of DFA in (49b). This rule states that a sonorant segment with a CORONAL node as a daughter of PLACE spreads CORONAL onto a following dorsal fricative. This creates a linked structure with both CORONAL and DORSAL nodes under PLACE, as in (49b). Therefore, the palatal fricative is a complex (corono-dorsal) segment.

(49) Dorsal Fricative Assimilation

a.

$$/\text{x}/ \rightarrow [\text{ç}] \;/\; \begin{bmatrix}\text{+sonorant} \\ \textsc{Coronal}\end{bmatrix} \underline{\quad\quad}$$

b.



The analysis above accounts for DFA when a dorsal fricative follows a vowel; in chapter 5, I will show how this analysis also works for RG words where an underlying consonant precedes a dorsal fricative. The reason I do not discuss these data here is that the underlying consonant that can precede the dorsal fricative is a liquid, and that liquid vocalizes in this context (i.e. when it is in the coda).

My analysis in (49) differs from the approach in SG taken by Hall (1992b:225) and Wiese (1996:213), who both argue that the underlying dorsal sound in question is an archiphoneme /X/. Under Hall's (1992b) approach, the front-back distinction among vowels is analyzed with the feature [back] ([-back] is the feature for front vowels and palatals, while [+back] is the feature for back vowels). Wiese (1996) analyzes this distinction with the feature [front] (front vowels and the palatal fricative are [+front], and back vowels and velar fricatives are [-front]). For Hall and Wiese, /X/ is underspecified for the feature which determines the front-back distinction. Under these analyses, DFA spreads this feature from a preceding vowel; thus, [back] spreads in Hall's (1992b) analysis, while [-front] spreads in Wiese (1996).

My analysis is more similar to the one proposed by Robinson (2001:113), who also analyzes front vowels as [Coronal] and back vowels as [Dorsal]. Under Robinson, DFA is the spreading of the feature [Coronal] onto a following dorsal fricative /x/, creating the complex segment [ç], which is specified as both [Coronal] and [Dorsal]. For discussion of why the present approach is superior to previous approaches, see Glover (2014:75), who also argues for a rule of DFA in SG as a spreading of the feature [CORONAL].

Data showing the interaction of Diphthongization (from 3.4.1) and DFA can be seen in (50).

(50) Diphthongization and DFA

	Ramsau German	Standard German	English
a.	[bux]/[buʊ̯x]	*Buch*	'book'
	[ʃuʊ̯x]	*Schuhe*	'shoes'
b.	[se.çi] ~ [seə̯.xi]	*sehe ich*	'I see'

In (50a), the back vowel undergoes Diphthongization; the second part of the diphthong is LABIAL, and thus it does not meet the structural description for DFA, so /x/ surfaces without change as [x]. In (50b), however, two different realizations for *sehe ich* surface. In the first example, the sequence /ex/ is realized as [eç] because /x/ undergoes DFA following CORONAL /e/. In the second example, /e/ undergoes Diphthongization; the sequence /eə̯x/ does not meet the structural description for DFA, so [ç] does not surface. Thus, Diphthongization bleeds DFA.

The derivation in (51) shows the interaction of these rules. In the first column, DFA applies when Diphthongization does not, while in the second column, application of Diphthongization blocks DFA. This derivation shows that DFA applies transparently, so there is no surface opacity.

(51) Derivation for two pronunciations of *sehe ich* from (50)

UR	/sex-i/	/sex-i/
Diph.	-----	seə̯xi
DFA	seçi	-----
PR	[se.çi]	[seə̯.xi]

DFA is shown to interact transparently with nasals (in chapter 4) and liquids (in chapter 5).

As noted earlier, [h] stands in complementary distribution with the two dorsal fricatives: [x]/[ç] only occur after a sonorant, while [h] only surfaces in word-initial position before a vowel. Data illustrating this distribution can be seen in (52).

(52) [h] and [x]

RG	**SG**	**Eng.**	**RG**	**SG**	**Eng.**
[h̲ox]	*hoch*	‘high’	[kox̲.tə]	*gekochte* (PP.)	‘boiled’
[h̲am]	*haben* (INF.)	‘to have’	[sa.x̲ɛ]	*Sache*	‘matter’
[ə h̲aʊ̯.xl̩]	*ein Hauchl*	‘hint’	[ə haʊ̯.x̲l̩]	*ein Hauchl*	‘hint’

Since [x] occurs only after a sonorant and [h] occurs only word-initially, I analyze [h] as an allophone of /x/. This proposal has been made in the previous literature on *ich-ach* in SG (Trim 1951), but many linguists (for example, Wiese 1996:165) do not adopt it because (in SG) there are contrasts between dorsal fricatives and /h/ in word-initial position (e.g. *Chemie* [çɛmi] ‘chemistry’ vs. *Hemd* [hɛmt] ‘shirt’). But in BG there are no word-initial dorsal fricatives (as stated in footnote 27, the <ch> in a word such as *China* ‘China’ is pronounced with [k]). In SG there are also a few words like *Ahorn* ‘maple’ and *Uhu* ‘eagle owl’ with an intervocalic [h] which contrasts with [x]; however, I hold that those words behave differently because they are loanwords and therefore do not discuss them further.

I analyze /h/ as an obstruent which lacks place features. For similar analyses of /h/ as placeless, see Clements (1985), Steriade (1987a), and Lloret (1995); for analyses of /h/ as an obstruent see Halle & Clements (1983:6). My analysis differs from other authors who argue for /h/ having place (see Hayward & Hayward 1989 for [guttural] and McCarthy

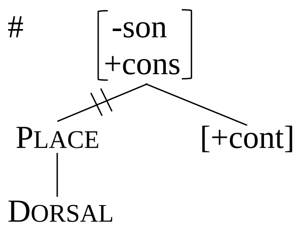
1994 for PHARYNGEAL) and authors, such as Roca & Johnson (1999:110), Odden (2005:148), and de Lacy (2006:67-68), who see /h/ as a sonorant. For analyses of sonorant /h/ in historic Germanic, see Howell (1991) and Iverson, Davis, & Salmons (1994).

A rule of RG Debuccalization is given in (53).

(53) Debuccalization

a. /x/ → [h] / # __

b.



(53a) states that word-initially, /x/ is realized as [h]. This rule is given in terms of features in (53b), where word-initially, a dorsal fricative de-links place, creating a placeless fricative (i.e. [h]).

3.4.3 Umlaut

This section discusses a process known as *Umlaut*, whereby back vowels shift to corresponding front vowels when the diminutive suffix is affixed to a word. It will be seen below that Umlaut in RG is very different from Umlaut in SG. I provide first some data and discussion of SG as a basis of comparison with RG. Representative examples of SG Umlaut with suffixation (of several different morphemes) are given in (54).

(54) SG Umlaut

Standard German	Gloss	English
[haʊ̯s ~ hɔɪ̯sçən]	*Haus ~ Häuschen*	‘house ~ little house’
[buːx ~ byːçlaɪ̯n]	*Buch ~ Büchlein*	‘book ~ little book’
[mʊtɐ ~ mʏtɐlɪç]	*Mutter ~ mütterlich*	‘mother ~ motherly’
[gʀoːs ~ gʀøːsɐ]	*groß ~ größer*	‘big ~ bigger’
[glɔkə ~ glœkçən]	*Glocke ~ Glöckchen*	‘bell ~ little bell’
[faːtɐ ~ fɛːtɐ]	*Vater ~ Väter*	‘father ~ fathers’
[bax ~ bɛçlaɪ̯n]	*Bach ~ Bächlein*	‘brook ~ little brook’

These data show alternations of back vowels with front vowels (or in the case of /aʊ/ with the front offglide [ɔɪ̯]). When the back vowel is rounded, the front vowel surfaces as rounded as well; thus, the SG alternations are: [aʊ̯] ~ [ɔɪ̯], [uː] ~ [yː], [ʊ] ~ [ʏ], [oː] ~ [øː], [ɔ] ~ [œ], [aː] ~ [ɛː], and [a] ~ [ɛ].

Previous analyses of SG Umlaut have accounted for why certain suffixes, like the diminutive, trigger umlaut alternations. For example, Wiese (1996:183) posits a floating [+front] feature which is a part of underlying root entries and only attaches to suitable root nodes. SG also has suffixes, such as *–heit*, which, as opposed to the diminutive, never trigger umlaut; see, for example, the word *Krankheit* [kʀaŋkhaɪ̯t] ‘illness’.[31] For other analyses of SG Umlaut, see King (1969), Wurzel (1970), Lieber (1981), Kloeke (1982), and Wiese (1987). My analysis of RG Umlaut is not intended to account for why certain suffixes (such as those in (54)) trigger Umlaut and others (such as *–heit*) do not; in fact, my data also necessitate underlying lexical specifications associated with morphological suffixation of the diminutive. This question is an issue which is peripheral for my dissertation, so I will not discuss it here; I am simply interested in the vocalic changes which result from RG Umlaut.

[31] For more discussion on the distribution of SG Umlaut triggered by suffixation, see Wiese (1996:181-194).

In SG, the morphemes -*chen* and -*lein* affix to noun stems to create the diminutive form. BG has its own diminutive morpheme – syllabic /l/ ([l̩]). As with the SG diminutives, when the BG diminutive suffix is added to a word with a back stem vowel, the vowel undergoes Umlaut. However, the output vowels of BG Umlaut are different than those in SG. In SG, when a back rounded vowel undergoes Umlaut, the output is a front rounded vowel. See, for example, *Buch* ~ *Büchlein* from (54), where the underlying stem vowel /uː/ becomes the front rounded vowel [yː] when the diminutive is added to the stem. As BG does not have front rounded vowel phonemes, it is unsurprising that the output of BG Umlaut is not front rounded vowels but rather unrounded vowels. Examples of vowel pairs for RG Umlaut are given in (55). The first four stem vowels show alternations of back rounded vowels with the corresponding front (unrounded) vowels. The last stem vowel listed in (55), /a/, does not alternate with a front vowel in in the umlaut context (i.e. when the diminutive suffix is added), but rather, it remains [a].

(55) Diminutives with Umlauted Vowels[32]

Stem Vowel	**Umlauted Form**	**RG Example**	**Gloss**	**English**
/aʊ/	[aɪ̯]	[haʊ̯s ~ haɪ̯.sl̩]	*Haus ~ Häusl*	‘house ~ little house’
/u/	[i]	[tsuk ~ tsi.gl̩]	*Zug ~ Zügl*	‘train ~ little train’
/ʊ/	[ɪ]	[bʊʃ ~ bɪ.ʃl̩]	*Busch ~ Büschl*	‘bush ~ little bush’
/o/	[e]	[kopf ~ ke.pfl̩]	*Kopf ~ Köpfl*	‘head ~ little head’
/a/	[a]	[man ~ man.ɾl̩]	*Mann ~ Männerl*	‘man ~ little man’

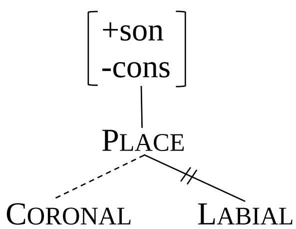
Analyses of SG Umlaut (cf. King 1969, Wurzel 1970, Lieber 1981, Kloeke 1982, Wiese 1987, 1996:181-194) describe Umlaut as a process of fronting, whereby a back vowel is

[32] There is no example of an alternation of [ɔ] ~ [ɛ] in my corpus; I consider this an accidental gap. The analysis given below can account for such data, however.

realized as the corresponding front vowel. But in RG, it is not clear whether or not the regular changes above (e.g. [u] to [i]) involves fronting or unrounding. Take, for example the RG data for *Zug* ~ *Zügl*, where [u] alternates with [i]; the change from /u/ to [i] could involve the change from DORSAL to CORONAL (along the lines of traditional analyses of SG), or it could involve the change deleting LABIAL. I see the latter interpretation as correct, as it not only accounts for data like *Zug* ~ *Zügl*, but also words like *Mann* ~ *Männerl*.

A rule of RG Umlaut is given in (56), using the distinctive features presented above.

(56) RG Umlaut[33]



Given the features of RG vowels, repeated in (57), the alternating pairs for Umlaut in RG from (55) only differ in terms of labiality. Thus, RG Umlaut in (56) states that the LABIAL node of a back vowel de-links, and a CORONAL node is simultaneously added to PLACE. As mentioned above, this rule occurs in a certain lexically specified context. RG Umlaut concerns the alternation of the back and front vowels [aʊ̯ u ʊ o] ~ [aɪ̯ i ɪ e].

[33] I follow the tradition of discussing these vocalic alternations concerning suffixation of the diminutive morpheme using the term “Umlaut”; it is clear, however, that RG Umlaut is not actually a fronting process but rather an unrounding one.

(57) Distinctive Features of RG Vowels

	/i/	/ɪ/	/e/	/ɛ/	/a/	/o/	/ɔ/	/u/	/ʊ/	/ə/
[sonorant]	+	+	+	+	+	+	+	+	+	+
[consonantal]	–	–	–	–	–	–	–	–	–	–
PLACE	✓	✓	✓	✓	✓	✓	✓	✓	✓	
[high]	+	+	–	–		–	–	+	+	
CORONAL	✓	✓	✓	✓						
LABIAL						✓	✓	✓	✓	
DORSAL					✓					
ATR	+	–	+	–		+	–	+	–	

Recall from (37) that the offglide in the diphthong /aɪ/ is CORONAL and that the offglide in /aʊ/ is LABIAL. Note that [ʊ̯] is not marked distinctively for DORSAL. The other front and back vowels which alternate [u ʊ o] ~ [i ɪ e] are also specified as LABIAL (the former) and CORONAL (the latter). Therefore, Umlaut simply has to account for the fact that vowels marked as LABIAL become CORONAL. Umlaut does not affect word pairs like *Mann* ~ *Männerl* because the underlying stem vowel /a/ is not LABIAL; rather, as can be seen in the representation repeated in (58), /a/ is DORSAL. Thus, /a/ does not fit the structural description of the rule.

(58) Feature representation of /a/

$$\begin{bmatrix}\text{+son}\\ \text{-cons}\end{bmatrix}$$

|

PLACE

|

DORSAL

There are two groups of words with /o/, which are realized differently when Umlaut applies. The first group has the alternation [o] ~ [e], as in (59a) (from (55)); the second group has the alternation [o] ~ [a], as in the example in (59b).

(59) Diminutives with /o/

	Stem Vowel	Umlauted Form	RG Example	Gloss	English
a.	/o/	[e]	[kopf ~ ke.pfl̩]	*Kopf ~ Köpfl*	[head ~ little head]
b.	/o/	[a]	[sok ~ sa.kl̩]	*Sack ~ Säckl*	[sack ~ little sack]

I argue that words with /o/ have a lexical specification which determines which category they belong to. Although I will not attempt to analyze the category with the alternation in (59b), it is clear that even in these examples, Umlaut is not a fronting process, but instead involves unrounding. I leave this open for further study. As with Diphthongization, there is a great amount of variation; while RG Umlaut associated with adding the diminutive morpheme to a stem is a productive process, it is not always used by speakers. For example, one speaker produced the non-alternating form [kopf ~ ko.pfl̩] for the diminutive in (59a).

Umlaut feeds DFA in RG. I give a representative word pair for this interaction in (60) and show the rules interacting in the derivation in (61).

(60) Umlaut and DFA

Ramsau German	Standard German	English
[bux] ~ [bi.çl̩]	*Buch ~ Büchl*	'book ~ little book'

(61) Derivation for Umlaut and DFA

UR	/bux/	/bux-l/
Umlaut	-----	bixl
DFA	-----	biçl
PR	[bux]	[bi.çl̩]

The second column in (61) illustrates the transparent distribution of the palatal fricative: it appears after phonemic front vowels as well as after derived front vowels.

3.4.4 Final Devoicing

As in SG, RG has a neutralization known as Final Devoicing (*Auslautverhärtung*), where voiced obstruents are realized as voiceless in a coda. Final Devoicing accounts for alternations, such as [g] ~ [k] in the words *Tag* ~ *Tage* [tak] ~ [ta.gə] 'day ~ days'. RG data representing such alternations are given in (62); the first word in each pair shows a devoiced coda stop, whereas the second word is realized with a voiced stop when the stop is in an onset.

(62) Final Devoicing

Ramsau German	**Standard German**	**English**
[gʀop ~ gʀa.bl̩]	*Grab* ~ *Gräbl* (DIM.)	'grave'
[liə̯t ~ liə̯.dl̩]	*Lied* ~ *Liedl* (DIM.)	'song'
[tsuk ~ tsi.gl̩]	*Zug* ~ *Zügl* (DIM.)	'train'

In SG, there are also alternations of voiced and voiceless fricatives, such as [f] ~ [v] in words like *akti[f] ~ akti[v]e* 'active' (Wiese 1996:200).[34] Although I do not have RG data for [f] ~ [v], I account for them in the analysis below.

When a stop is underlyingly voiceless, it is realized as voiceless both in an onset and a coda; representative data are given in (63).[35] The examples in (63) show that the alternations in (62) cannot be accounted for with underlying /p t k/ which voice before a vowel.

(63) Underlying Voiceless Stops

Ramsau German	**Standard German**	**English**
[aŋ.gɛ.bot ~ aŋ.gɛ.bo.tl̩]	*Angebot ~ Angebotl* (DIM.)	'offer'
[sok ~ sa.kl̩]	*Sack ~ Säckl* (DIM.)	'bag'

The current analysis uses the features given in section 3.2.2, where the difference between voiced and voiceless obstruents is the presence or absence of the privative nodes LARYNGEAL and VOICE. When LARYNGEAL (and thus also VOICE) is attached to a ROOT, this represents a voiced segment; when LARYNGEAL is absent, this is a voiceless segment.[36] See the representations in (64).

---

[34] SG also has alternations of [s] ~ [z] in words like *Gra[s] ~ Grä[z]er* 'grass ~ grasses' as well as [ʃ] ~ [ʒ] in *oran[ʃ]e ~ Oran[ʒ]e* 'orange (color) ~ orange (fruit)' (see Wiese 1996:200-205 for discussion). As RG does not have the voiced fricatives [z] or [ʒ], these types of alternations are not explored here.

[35] I do not have an example of underlying final /p/ in these contexts, as there are very few German words with word-final /p/. This is an accidental gap.

[36] For other analyses of the voicing contrast using privative VOICE, see Lombardi (1991, 1999) and Brockhaus (1995).

(64) Representations for Voicing in Obstruents

a. Voiced Obstruent

$$\begin{array}{c}\begin{bmatrix}\text{-son}\\ \text{+cons}\end{bmatrix}\\ |\\ \text{L}\small{\text{AR}}\\ |\\ \text{V}\small{\text{OICE}}\end{array}$$

b. Voiceless Obstruent

$$\begin{bmatrix}\text{-son}\\ \text{+cons}\end{bmatrix}$$

The rule of Final Devoicing, which accounts for the alternations in (60) is given in (65a), and states that a voiced stop is realized as voiceless syllable-finally. This rule is shown with features in (65b), where the LARYNGEAL node delinks from the ROOT, creating a voiceless obstruent.

(65) Final Devoicing

a. /b d g/ → [p t k] / ____ $]_\sigma$

b.

$$\begin{array}{c}\begin{bmatrix}\text{-son}\\ \text{+cons}\end{bmatrix}\\ \text{ǂ}\\ \text{L}\small{\text{AR}}\\ |\\ \text{V}\small{\text{OICE}}\end{array}\quad \Big]_\sigma$$

This rule, which does not specify a value for the feature [continuant], can account for Final Devoicing data of both stops and fricatives, such as *akti[f] ~ akti[v]e* ‘active’ (Wiese 1996:200), as discussed above.

3.4.5 Glide Formation

In addition to the consonants and vowels discussed in 3.2 and 3.3, RG also has the surface glide [j].[37] In contrast to the offglides in diphthongs, [j] surfaces in the onset,[38] e.g. in (66):

(66) [j]

Ramsau German	**Standard German**	**English**
[jo]	*ja*	'yes'
[ja.kŋ̍]	*Jacke*	'jacket'

I follow many authors who consider [j] to be a positional variant of /i/ in SG: [i] occurs in a nucleus and [j] in an onset. Therefore, there is no contrast between words such as [ja] and [i.a]. [j] is derived via a rule known as Glide Formation, which states that the high front vowel is realized as [j] pre-vocalically (Hall 2008:309 for SG), as in (67):

(67) Glide Formation (first version) (from Hall 2008:309)[39]

/ɪ/ → [j] / ___ V

For discussion of the glide [j] and analyses of Glide Formation in SG, see also Trubetzkoy (1939), Moulton (1962), Wurzel (1970), Kloeke (1982), Yu (1992), Hall (1992b, 2004,

[37] The glide [w] can also surface in the onset in RG as an alternate pronunciation of /v/ and intervocalic /b/. For example, the word *Wasser* 'water' can be pronounced as either [<u>w</u>o.sɐ] or [<u>v</u>o.sɐ]. Variation of /v/ occurs within speakers, so one speaker might produce a word like Wasser with [v] one time and then with [w] the next. This pronunciation of RG [w] reflects an earlier stage of German (i.e. MHG). /v/ is consistently pronounced as [w] in other varieties of Bavarian, such as Imst German described by Schatz (1897:7-8); interested readers are also referred to discussion of Westphalian German in Hall (2014). Intervocalic /b/ also surfaces as [w] in words such as *selber* 'self': [sɛ.wɐ] ~ [sɛ.bɐ]. For more discussion of this, see Zehetner (1985:85) and Merkle (2005:28 §24).

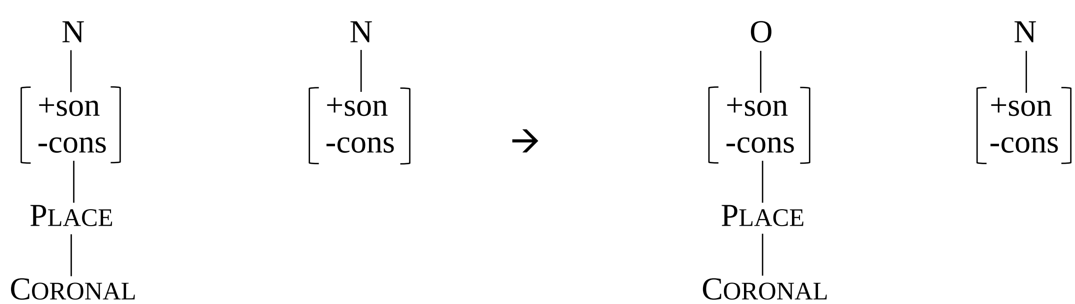
[38] I only have word-initial examples of [j]; there are no words in my corpus with word-internal syllable-initial [j] such as SG *Boje* [boː.jə] 'buoy'.

[39] I present this rule with the symbol /ɪ/, while Hall (2008) uses /i/. My analysis would not change if I used /i/, as a glide is not specified for tenseness or height; the transcription of this vowel with /ɪ/ is consistent with discussion of diphthongs above.

2006, 2007a, 2008), Wiese (1996), and Hamann (2003). Many authors contend that the glide [j] in the onset of a word like *Jacke* in (66) is the same phonologically as the non-syllabic high front vowel [ɪ̯] in a word like *Hai* [haɪ̯] (from 31a), and it is therefore common to transcribe the diphthong [aɪ̯] as [aj] (cf. for example Hall 2004:1040, 2007a:4). In this dissertation, when [j] is in an onset, as in (66), it is transcribed as [j]; when it is in a diphthong, as in (31, 33), it is transcribed as [ɪ̯]. It is important to note, however, that the features of [ɪ̯] and [j] are identical; that is, they are [+sonorant, -consonantal, CORONAL], as given in (37a,c). This means that a word like *ja* [ja] 'yes' is underlyingly /ɪa/.

As [j] (/ɪ/) is [-consonantal], it receives a nucleus via Syllabification in (35). Thus, in a word like [ja], both /ɪ/ and /a/ have a nucleus; Glide Formation turns nuclear /ɪ/ into a glide (i.e. it gets an onset) before another [-consonantal] segment. Glide Formation is given with features in (68).

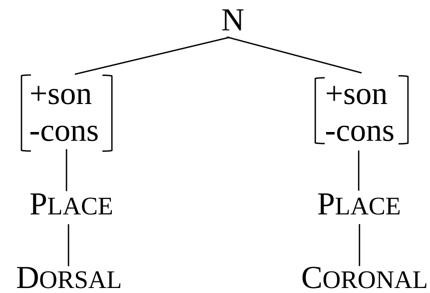
(68) Glide Formation (final version)



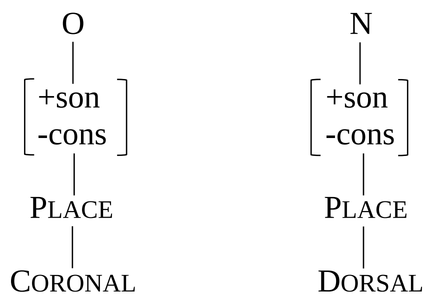
Glide Formation states that when nuclear /ɪ/ is followed by another nuclear vowel, /ɪ/ receives an onset. Representations for the diphthong /aɪ/ ([aɪ̯]) and the syllable [ja] are given in (69).

(69) Featural Representations with coronal glide

a. /aɪ/:



b. [ja]:



In (69a), both /a/ and /ɪ/ are in the same nucleus, which is present underlyingly; thus, [ɪ̯] is the offglide to the diphthong. In (69b), the glide [j] (from /ɪ/) is realized on the surface as an onset.

3.5 Conclusion

This chapter has presented data for the consonantal and vocalic inventories of RG and assigned distinctive phonological features for each underlying segment. These features have been used to analyze six common phonological processes in RG (Diphthongization, Dorsal Fricative Assimilation, Debuccalization, Umlaut, Final Devoicing, and Glide Formation) which interact with processes discussed in subsequent chapters. The present chapter has laid the foundation for understanding the sonorant segments of RG in terms of features. The next chapter expands on discussion of RG nasals from section 3.2 and uses the features from this chapter to analyze several processes involving nasal sonorant segments in RG.

CHAPTER 4

RG NASALS AND OPACITY

4.1 Introduction

This chapter focuses on processes associated with RG nasals. Several assimilations are discussed, as well as deletions of nasal consonants and voiced stops (that serve as triggers to assimilations). These processes will be shown to interact opaquely, both in counterbleeding and self-destructive feeding orders (Baković 2007, 2011). The chapter is organized as follows: In section 4.2, I discuss data motivating rules of Nasal Place Assimilation (both regressive and progressive) and Voiced Stop Deletion. Section 4.3 provides data and analysis of Vowel Nasalization and Nasal Consonant Deletion. In section 4.4, Nasal Place Assimilation is shown to interact transparently with Dorsal Fricative Assimilation. In section 4.5, I discuss self-destructive feeding and opacity and how these topics relate to data and analyses in sections 4.2-4.3, and I conclude in section 4.6.

4.2 Nasal Place Assimilation and Voiced Stop Deletion

4.2.1 Regressive Nasal Place Assimilation

As in SG, RG has a rule of Regressive Nasal Place Assimilation, whereby a nasal assimilates to the place of a following stop. For example, in the RG word *gedacht* [dɛŋk] 'thought', the nasal /n/ is produced as dorsal [ŋ] when it precedes the voiceless dorsal stop. Examples of words illustrating Regressive Nasal Place Assimilation (NPA) are given in (1), where (1a) shows labial assimilation, (1b) coronal, and (1c) dorsal. (For examples in SG, see Wiese 1996: 219.) The surface nasal in all of the examples in (1) derives from /n/.

(1) Regressive NPA[40]

	Ramsau German	Standard German	English
a.	Labial		
	[ɔ**m**.**p**ɪ]	*Ampel*	‘traffic light’
b.	Coronal		
	[ʊ**n**.**t**ɐ]	*unter*	‘under’
	[fɪ**nt**]	*finde* (1. SG)	‘to find’
c.	Dorsal		
	[dɛ**ŋk**]	*gedacht* (PP)	‘thought’
	[dʊ**ŋ**.**k**ɪ]	*dunkel*	‘dark’

The reason for an underlying /n/ is that there is no contrast between coronal [n] and dorsal [ŋ] before a dorsal. The same is true before a labial: [n] and [m] do not contrast in this context. In a nasal plus stop sequence, [n] only surfaces before the stop if it is coronal. Labial [m] can, however, also occur before coronal or dorsal stops. See, for example, the data in (2), taken from a Styrian dialect dictionary (Unger & Khull 1903), where there is underlying /m/ (and not /n/) before /d/ and /t/. Similarly, /m/ is underlying before a dorsal in a word like *Imker* in (3). These data contrast with an example such as *finde* in (1b), where /n/ is before /d/; that is, the coronal nasal is homorganic with the following stop.

(2) Labial-Coronal Sequences

Underlying	Styrian German	English
/md/	*He*[mt]*knöpfel*	‘flower with white blossoms’
/mt/	*A*[mt]*brunn*	‘salt spring’

(3) Labial-Dorsal Sequence

Ramsau German	Standard German	English
[ɪ**m**.**k**ɐ]	*Imker*	‘beekeeper’

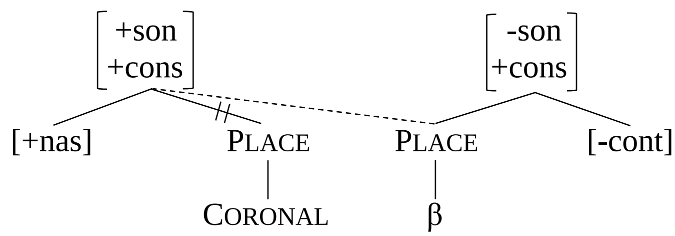
[40] No examples are given here with [m] before [b] or [ŋ] before [g]; the absence of such examples in my corpus is an accidental gap.

A rule of Regressive NPA is given in (4a), which states that an underlying /n/ is realized with the same specification for PLACE (notated with ‘β’) as a following stop. This rule is shown in (4b) with Feature Geometry, where PLACE spreads from a stop to a preceding coronal nasal, causing the PLACE node to delink. The second PLACE node in (4b) dominates ‘β’, which is intended to represent any PLACE feature.

(4) Regressive NPA

a. /n/ → [β PLACE] / ____ $\begin{bmatrix} \text{-son} \\ \text{+cons} \\ \text{-cont} \\ \beta\ \text{PLACE} \end{bmatrix}$

b.



Regressive NPA produces a transparent output in the sense that the trigger (stop) is present and does not delete. This is different from the interaction of the progressive rule of nasal place assimilation with Voiced Stop Deletion, which will be discussed in the following sections.

4.2.2 Progressive Nasal Place Assimilation

In contrast to Regressive NPA, RG Progressive NPA (PNPA) and the subsequent deletion of the voiced stop trigger for the latter rule produce opaque outputs. PNPA is particularly robust in infinitive forms of verbs, as it applies to the infinitive suffix /-n/, which attaches onto verbal stems which serve as triggers. When a verb stem ends in a consonant, the following infinitive marker surfaces with the same place of articulation as the stem-final consonant. For example, in the word *denken* [dɛŋ.kŋ̍] 'to think' in (5c), the infinitive /-n/ surfaces as the dorsal nasal [ŋ] when it attaches to the stem which ends in /k/, but it surfaces without change as [n] when the stem ends in /t/, as in *raten* from (5b). Examples of PNPA in verbal infinitives are given in (5-6): (5) shows PNPA when verb stems end with a voiceless stop, and (6) with stem-final fricatives. I only consider voiceless stops in this section because the voiced stops which serve as triggers undergo a deletion, thereby rendering the outputs opaque. Because of this added complication, I omit them from the data sets in the present section and discuss them in section 4.2.3. In each data set, the infinitive marker matches the place of articulation of the preceding stem-final consonant, be it labial, coronal, or dorsal.

(5)	PNPA: Stem-final voiceless stop		
	Ramsau German	**Standard German**	**English**
a.	Labial		
	[tsiɐ̯.**pm̩**]	*zirpen* (INF.)	'to chirp'
b.	Coronal		
	[ʀo.**tn̩**]	*raten* (INF.)	'to guess'
	[ox.**tn̩**]	*achten* (INF.)	'to regard'
c.	Dorsal		
	[dɛŋ.**kŋ̍**]	*denken* (INF.)	'to think'
	[ʃlʊ.**kŋ̍**]	*schlucken* (INF.)	'to swallow'

(6) PNPA: Stem-final fricative

	Ramsau German	**Standard German**	**English**
a.	Labial		
	[ʃlo.**fm̩**][41]	*schlafen* (INF.)	‘to sleep’
	[sʊɐ̯.**fm̩**]	*surfen* (INF.)	‘to surf’
b.	Coronal		
	[mɪ.**sn̩**]	*müssen* (INF.)	‘must’
	[le.**sn̩**]	*lesen* (INF.)	‘to read’
c.	Dorsal		
	[mo.**xŋ̩**]	*machen* (INF.)	‘to make’

The linear rule of PNPA in (7a) states that an underlying /n/ inherits the same place (β PLACE) as a preceding non-nasal consonant. The assimilatory aspect of PNPA is more illustratively displayed in the feature geometric rule in (7b), which shows that the daughter of PLACE spreads from a non-nasal consonant to a following nasal, thereby producing a linked structure. After spreading occurs, the CORONAL node of the nasal delinks. Note that it is the daughter of PLACE, and not PLACE, which spreads here (cf. Regressive NPA in (4)). This formulation is necessary because of how PNPA interacts with DFA, which will be discussed in section 4.4. Note also that the trigger is necessarily both [+cons] and [-nas], and not simply [+cons]; when a verb stem ends in a nasal, such as *schwimmen* ‘to swim’, the infinitive marker /n/ does not become labial, as it would if it were to undergo PNPA. Instead, *schwimmen* is produced as [ʃvɪ.mə]. Such data will be explored more thoroughly in sections 4.3.2-4.3.3. Finally, the liquids /l ʀ/ do not trigger PNPA because of a

[41] The labial nasal output of PNPA is bilabial [m], and not labiodental [ɱ], even when the fricative trigger is labiodental /f/. That is, the [m] produced by PNPA is the same as the underlying labial nasal /m/. This follows from the features presented in chapter 3, as there is a LABIAL feature, but no other feature which indicates that a labial sound is labiodental.

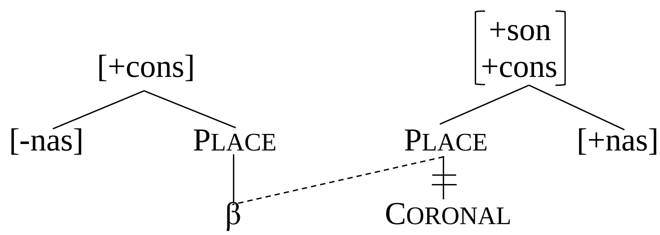
vocalization process they undergo, whereby coda liquids are realized as offglides; vocalization is shown in 5.3.4 to bleed PNPA.

(7) Progressive Nasal Place Assimilation

a.

$$/n/ \rightarrow [\beta\ \textsc{Place}] \ / \ \begin{bmatrix} +\text{cons} \\ -\text{nas} \\ \beta\ \textsc{Place} \end{bmatrix} \underline{\qquad}$$

b.



When the segment preceding /-n/ is a vowel, that suffix surfaces as coronal [n]. See, for example, the word *kauen* ‘to chew’, which is pronounced [kau̯n].

The RG rule in (7b) is different than SG PNPA in terms of features. In SG, stops always spread their place of articulation to /n/, but fricatives do not always do this. Wiese (1996:223) summarizes the status of SG PNPA by stating: “… the assimilation is a phonetic phenomenon of (optional) co-articulation with all fricatives as triggers, but a true regularity in the phonological domain with preceding non-continuants.” Wiese cites Hall (1992b), who shows that only stops are triggers for PNPA. Wiese (1996) gives a rule where only [-continuant] consonants spread place features onto a nasal unspecified for place. SG PNPA is thus clearly different from RG, because the infinitive /-n/ regularly assimilates the PLACE node of both stops and fricatives in RG.

4.2.3 Voiced Stop Deletion

PNPA also applies to stems which end in a voiced stop (see the data in (8)); however, there is an added complication, as the voiced stop does not surface in the infinitive form. For example, in verbs like *geben* [gem] in (8a), *reden* [ren] in (8b), and *fragen* [fʀoʊ̯ŋ] in (8c), the voiced stops /b, d, g/ which trigger PNPA do not surface. Underlying representations with /b d g/ in examples like these are motivated because the stops surface as [p t k] in coda position, e.g. 3. SG. form of *geben* in (8a).[42]

(8) Progressive NPA: Stem-final voiced stop

	Ramsau German	**Standard German**	**English**
a.	Voiced Labial Stop (/b/)		
	[ge**m**]	*geben* (INF.)	'to give'
(cf.)	[gɪ**p**t]	*gibt* (3. SG)	'to give'
	[liə̯**m**]	*lieben* (INF.)	'to love'
(cf.)	[liə̯**p**]	*lieb* (ADJ.)	'beloved'
b.	Voiced Coronal Stop (/d/)		
	[re**n**]	*reden* (INF.)	'to talk'
(cf.)	[re**t**]	*reden* (3. SG)	'to talk'
c.	Voiced Dorsal Stop (/g/)		
	[fʀoʊ̯**ŋ**]	*fragen* (INF.)	'to ask'
(cf.)	[fʀo**k**t]	*fragt* (3. SG)	'to ask'

Examples like [gem] involve overapplication because the [m] is created from /n/ after /b/, even though the [b] does not surface. I argue below that data like those in (8) exemplify a self-destructive feeding relationship (Baković 2007, 2011).

[42] The stop which surfaces in these forms is in a syllable coda, and thus devoices via Final Devoicing (cf. discussion in section 3.4.4). It is clear that the data in (8) have underlyingly voiced (and not voiceless) stops because these data behave differently than those in (5) where voiceless stops are underlying. In (5b), for example, voiceless /t/ is underlying and surfaces in a word like *raten* [ʀo.tn̩]. When voiced stops are underlying, as in (8), the voiced stop does not surface in this environment.

Further examples of a voiced stop alternating with zero in BG can be seen in word pairs such as *leben* ~ *lebendig* [lem] ~ [le.bɛn.dɪk] 'to live ~ alive', which show the voiced stops surfacing because the following sound is a vowel and not /n/ (Merkle 2005:34). Full present tense indicative verbal paradigms which show the alternation of [b d g] ~ Ø are given in (9).[43] Orthographic <ng> represents the dorsal nasal [ŋ].

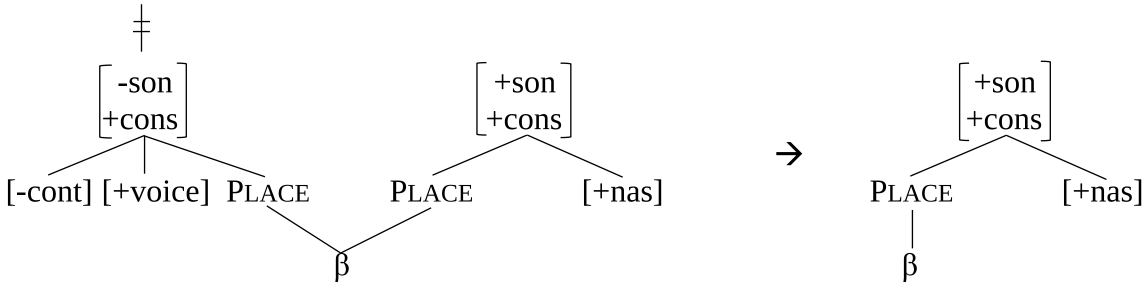
(9) Alternations of [b d g] ~ Ø in BG verbs (Zehetner 1985:95)

	leben 'to live'	*reden* 'to talk'	*sagen* 'to say'
INF.	leem	reen	sǫǫng
1.SG.	leeb	reed	sǫǫg
2.SG.	lebsd	redsd	sǫgsd
3.SG.	lebd	redd	sǫgd
1.PL.	leem	reen	sǫǫng
2.PL.	lebds	redds	sǫgds
3.PL.	leem	reen	sǫǫng

I argue that the data in (8-9) show that a voiced stop triggers PNPA and then deletes. That is, when a voiced stop is place-linked to a following nasal, the root of the voiced stop de-links from a higher constituent, and the output is simply a nasal with the same place of articulation as the deleted voiced stop. This rule is given in (10).

[43] The symbols used here are Zehetner's (1985). While Zehetner (1985) does not show Final Devoicing in surface forms, it is clear that voiced stops are underlying in these verb forms, considering the alternations of surface stops with zero. If these stops were underlyingly voiceless, they would be expected to surface in all forms, particularly those with the nasal infinitive marker /-n/, as in the infinitives in (5).

(10) Voiced Stop Deletion (VSD)



I assume that the data in (8-9) are representative of a deletion process, but this could alternatively be argued to be coalescence, where the two place-linked ROOT nodes (stop and nasal) are realized as one nasal with the place of the underlying stop. It is not clear how such a coalescence would be captured within a rule-based framework; therefore, this kind of analysis is not pursued here.

Kohler (1995:208-211) cites similar data to those in (8-9) in SG;[44] however, he makes clear that these rules are dependent on certain linguistic variables, such as tempo, pauses, accent, and environment. He writes that these changes are "totally and stylistically variable" (*total und stilistisch variabel*) (Kohler 1995: 206). Therefore, data such as those in (8) are different in SG and RG because they are entirely optional and variable in SG, but in RG (even in slower speech), these rules are obligatory.

A derivation showing the interaction of PNPA and VSD is given in (11a). It can be observed that the infinitive marker /-n/ assimilates PLACE to a preceding voiceless stop, fricative, and voiced stop via PNPA. VSD only applies to the third example, *geben*; deletion applies here because of the linked structure created through PNPA.

[44] Kohler (1995) calls these processes assimilations and degeminations.

(11) Derivation of PNPA and VSD
with *schlucken*, *schlafen*, and *geben*

a. Self-Destructive Feeding (Overapplication)

UR	/ʃlʊk-n/	/ʃlof-n/	/geb-n/
PNPA	ʃlʊkŋ	ʃlofm	gebm
VSD	-----	-----	gem
PR	[ʃlʊ.kŋ̩]	[ʃlo.fm̩]	[gem]

b. Counterfeeding (Underapplication)

UR	/geb-n/
VSD	------
PNPA	gebm
PR	*[ge.bm̩]

In the third example in (11a), PNPA feeds VSD because PNPA creates the context for VSD to apply (place-linked sequence of voiced stop plus nasal). This is a special kind of feeding order called self-destructive feeding (Baković 2007, 2011), where a feeding order involves overapplication (cf. discussion of opacity in chapter 1). The RG examples are opaque because the trigger for PNPA is deleted. Traditional rule-based analyses argue that no feeding order can produce an opaque output with overapplication, and that if there is overapplication, the rules must be in a counterbleeding order (see Baković 2007, 2011, and sources cited therein). However, if the rule order in (11a) is reversed, as in (11b), the output is not a *bleeding* order (as would be expected if (11a) were true counterbleeding), but rather a *counterfeeding* order with underapplication: VSD does not apply in (11b) because the stop is not homorganic with a following nasal. Therefore, these rules are necessarily in a feeding order which produces overapplication opacity, i.e. self-destructive feeding.

It could be argued that examples like [gem] do not exhibit self-destructive feeding but rather a counterbleeding order, and that VSD has simply not been formalized correctly. One could accordingly argue that VSD is actually a more general rule, as in (12):

(12) Voiced Stop Deletion (to be rejected)

/b d g/ → Ø / ____ [+nasal, +cons]

The rule in (12) states that voiced stops delete before any nasal consonant (not simply a nasal consonant which is place-linked to the voiced stop). This rule, however, cannot account for data where a voiced stop fails to delete when the following nasal is not homorganic, as in the RG data in (13).[45]

(13) Non-homorganic voiced stop-nasal clusters

	Ramsau German	Standard German	English
a.	[va.**gn**ɐ]	*Wagner*	'Wagner (name)'
b.	[iɐ̯.**gn̩**t.aɪ̯̃]	*irgendein*	'any'

(13a) shows the surface sequence of [gn] in the onset of the second syllable in the name *Wagner*. The example in (13b) is even more illustrative because it shows a voiced stop as the onset to a syllable with syllabic nasal [n̩] (as would be the expected syllable type of the infinitive verbs in (8), were they not to undergo VSD). The post-/g/ nasal in (13b) has not assimilated place to the preceding voiced stop via PNPA in (7); I posit that this is because the /n/ undergoes RNPA in (4), so it is place-linked to the following /d/ (i.e. [t] in (13b)). Thus, RNPA blocks PNPA. Since place is not linked between /g/ and /n/ in (13b), the stop

[45] There are certainly more examples in RG like (13), but they are not present in my corpus. For example, I predict that in a word like *einigem* 'some (DAT.)', where there would be a syllable [gm̩], the stop /g/ would never delete via a more generalized rule like (12).

cannot delete via the original rule of VSD (10). If (12) were the correct rule for VSD, it would incorrectly delete the [g] in (13a,b).[46]

4.3 Vowel Nasalization and Nasal Deletion

4.3.1 Vowel Nasalization

There are nasalized vowels in RG, which have a predictable distribution because they only surface before an underlying nasal consonant. In all other contexts, vowels are oral. All RG phonemic vowels can be nasalized by a rule to be stated below; a table of nasalized monophthongs (from chapter 3) is repeated in (14).

(14) RG Allophonic Monophthongs

	FRONT			BACK	
HIGH	ĩ	ɪ̃		ʊ̃	ũ
MID	ẽ	ɛ̃	ə̃	ɔ̃	õ
LOW			ã		

Data with these nasalized vowels are given in (15).

(15) Vowel Nasalization

	Ramsau German	Standard German	English
a.	[sɪ̃.ŋə]	*singen* (INF.)	'to sing'
b.	[tsɪ̃.mɐ]	*Zimmer*	'room'
c.	[ɪ̃n.stʀə̃.mẽnt]	*Instrument*	'instrument'
d.	[hɛ̃ŋt]	*hängt* (3. SG.)	'to hang'

[46] In RG past participles, such as *gemacht* 'made', the *ge-* (/g/) is not pronounced; the past participle is simply [moxt]. I consider this to be a morphological issue, rather than an example of VSD, as the *ge-* prefix is also not produced in a word like *gedacht* [dɛŋk] 'thought', where the stem begins with a stop /d/, and not a nasal. Compare this to data such as *gelaufen* [gla.fm̩] 'ran' or *gewusst* [gvist] 'knew', where *ge-* surfaces as [g].

e.	[və.ʀũm]	*warum*	‘why’
f.	[ʊ̃n.tɐ]	*unter*	‘under’
g.	[õ.nə]	*ohne*	‘without’
h.	[mɔ̃n.ʃoft]	*Mannschaft*	‘team’
i.	[bə̃m]	*beim* (NT. DAT.)	‘by’
j.	[kãm]	*kaum*	‘hardly’

The data in (15) show that a vowel which precedes a nasal consonant surfaces as a nasalized vowel. I capture the distribution of nasalized vowels by analyzing all underlying vowels as oral and by positing a rule which nasalizes any oral vowel before a nasal consonant. For example, in the word *kaum* in (15j), the underlying stem vowel /a/ is realized as nasalized [ã] preceding the nasal consonant [m]. It can also be observed in (15) that the nasalization rule I posit below regularly applies to vowels to the left of all three RG nasal consonants [m n ŋ]. Note that the nasalized vowel can be tautosyllabic with the nasal consonant (e.g. *kaum* in (15j)), or heterosyllabic (e.g. *Zimmer* in (15b)).

A feature representation for RG nasalized vowels is given in (16). The difference between this representation and that of the oral vowels is that nasalized vowels have a separate [+nasal] node under the ROOT node.

(16) Feature Representation of Nasalized Vowels

$$\begin{array}{c} \begin{bmatrix} \text{+son} \\ \text{-cons} \end{bmatrix} \\ | \\ [\text{+nasal}] \end{array}$$

I give a rule for Regressive Vowel Nasalization RVN in (17) to account for the nasalized vowels in (15). In (17a), the rule is stated linearly: a vowel is realized as nasalized when it precedes a nasal consonant. I see nasalization as an assimilation of the feature [+nasal], and therefore I posit the rule in (17b) with features. This rule states that the [+nasal] node of a sonorant consonant spreads leftwards to a preceding vowel.

(17) Regressive Vowel Nasalization

a. V → Ṽ / ___ N

b. $\begin{bmatrix}\text{+son}\\ \text{-cons}\end{bmatrix} \qquad \begin{bmatrix}\text{+son}\\ \text{+cons}\end{bmatrix}$

[+nas]

I show in section 4.3.2 that there are certain nasalized vowels which are not followed by nasal consonants on the surface. I argue that these opaque nasalized vowels are not phonemic, but instead that they are followed by nasal consonants in the underlying representation and consequently undergo (17), after which the nasal consonant triggers are deleted.

4.3.2 Nasal Consonant Deletion

It can be observed in (18) that there are alternations between [n] and zero in certain RG morphemes. For example, in the word *schön* in (18a), the word ends in a nasalized vowel (without a following nasal consonant), but when there is a vowel in the following syllable, as in *wunderschöne*, the underlying /n/ surfaces without change as [n] in the onset to that syllable.

(18) Alternations of [n] ~ Ø

	Ramsau German	Standard German	English
a.	[ʃẽ]	*schön*	'pretty'
	[võn.də.ʃẽ.nə]	*wunderschöne*	'beautiful'
b.	[kɔ̃]	*kann* (1. SG.)	'can'
	[kẽ.nə]	*können* (INF.)	'can'

On the basis of alternations like these, I argue that a nasal consonant is underlying in words like *schön* and *kann*. The alternant without the nasal shows the effects of a rule of nasal consonant deletion I posit below.

Some RG morphemes have nasalized vowels which are unlike the examples in (15, 18) because they are never followed by a nasal consonant (see (19)). The reason there are no alternations between [n] and zero in these examples is that there are no vowel-initial suffixes which can attach to these morphemes. I argue that the nasalized vowels are derived from an underlying oral vowel plus nasal consonant (/n/), which undergoes the same rules of vowel nasalization and consonant deletion that applies in the examples in (18). I justify this approach below. The deletion of /n/ occurs word-finally in all word classes (nouns, verbs, adjectives, prepositions, etc.).

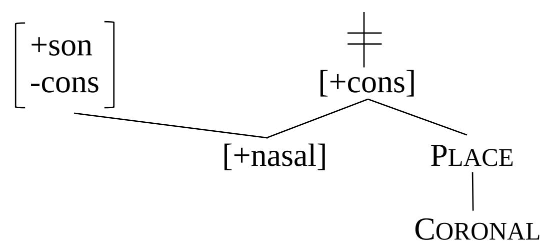
(19) Nasal Consonant Deletion

	Ramsau German	Standard German	English
a.	[gẽ]	*gehen* (INF.)	'to go'
b.	[ʃõ]	*schon*	'already'
c.	[ã]	*an*	'on'
	[vã]	*wann*	'when'
	[dã]	*dann*	'then'

One reason for positing an underlying /n/ when nasalized vowels surface without a nasal consonant alternant is that in careful speech, speakers often produce post-vocalic [n] in examples like the ones in (19). In fact, even in regular speech, this /n/ sometimes surfaces. For example, the compound word *Mannschaft* 'team' is often produced as [mɔ̃n.ʃoft], where /n/ is pronounced, while the word *Mann* 'man' most often surfaces as [mɔ̃]. This variation in surface forms motivates existence of underlying /n/ in the morphemes in (19).

The deletion of /n/ following nasalized vowels in (18-19) can be captured with a rule of Nasal Consonant Deletion (NCD), which states that an underlying coronal nasal deletes word-finally after a vowel which shares the [+nasal] node. This is given in (20).

(20) Nasal Consonant Deletion (to be revised)[47, 48]



The derivation of RVN and NCD in (21a) shows a self-destructive feeding order (cf. discussion in section 4.2.3 of the self-destructive feeding interaction of PNPA and VSD). RVN feeds NCD because the former process produces the context for the latter.

[47] NCD occurs specifically in the context of after a nasalized vowel and not simply any vowel because when VN fails to apply, /n/ never deletes. For example, the word *Wien* 'Vienna' is often produced as [vin], where the vowel is oral. In these instances where an oral vowel precedes /n/, the word-final nasal does not delete.
[48] NCD does not occur in verbal infinitives when the stem ends in an underlying voiced coronal stop. In these instances, [n] always surfaces; see, for example, *reden* [ʀen] 'to talk' from (8b), which undergoes PNPA and VSD but not NCD.

Since NCD is a process which deletes the trigger for RVN (i.e. word-final coronal nasal), this derivation shows overapplication opacity; as RVN and NCD are in a feeding order, this is another example in RG which exhibits self-destructive feeding.

(21) Derivation of RVN and NCD with *schön*

a. Self-Destructive Feeding (Overapplication)		b. Counterfeeding (Underapplication)	
UR	/ʃen/	**UR**	/ʃen/
RVN	ʃẽn	**NCD**	----
NCD	ʃẽ	**RVN**	ʃẽn
PR	[ʃẽ]	**PR**	*****[ʃẽn]

As mentioned above, examples of self-destructive feeding are often mislabeled as counterbleeding because they produce overapplication opacity. However, if the RG data for RVN and NCD showed true counterbleeding, then the reverse order of rules should show a bleeding order (cf. discussion in chapter 1).[49] As can be seen in (21b), reversal of these rules produces *underapplication,* i.e. a counterfeeding order.

In this dissertation, instances where RVN is not predictable based on the surface form are marked with the nasal symbol '˜' over the respective vowel. Thus, nasalized vowels in all phonetic transcriptions below are opaque.

[49] If NCD applied after any vowel (and not only nasalized vowels), then the rule interaction would be counterbleeding because the reversal of the correct rule ordering would be bleeding. However, as noted above, NCD is restricted to the context of before a vowel marked as [+nasal]. Therefore, this is an instance of self-destructive feeding.

4.3.3 Schwa Epenthesis

When a stem ends in a nasal consonant and a suffix /-n/ is added, the coronal nasal suffix is not realized; instead, only schwa can be seen on the surface. This occurs in morphemes of various word classes, such as in verbs with the infinitive marker /-n/.[50] See, for example, the data in (22), where the verbal infinitives in (22a) show schwa after the stem, such as in the word *schwimmen*; however, the verbs in (22b), which have stems ending in coronal obstruents, surface with syllabic [n̩] following the stem.

(22) Alternations of /n/ ~ Ø: Stem-final nasal

	Ramsau German	Standard German	English
a.	Schwa Epenthesis		
	[ʃvɪ.mə]	*schwimmen* (INF.)	‘to swim’
	[ʀe.nə]	*rennen* (INF.)	‘to run’
	[si.ŋə]	*singen* (INF.)	‘to sing’
b.	Nasal Infinitive Marker		
	[ʀo.tn̩]	*raten* (INF.)	‘to guess’
	[vi.sn̩]	*wissen* (INF.)	‘to know’

One might argue that the data in (22a) show that schwa is inserted after any word-final nasal. This cannot be the case, however, because there are many data where word-final nasals never have an epenthetic schwa following. For example, schwa is never epenthesized at the end of the words *Baum* [bam] ‘tree’ or *Regen* [ʀɛŋ] ‘rain’.

I argue that the data in (22a) are opaque because the trigger for epenthesis is absent on the surface. There are two processes which stand in a counterbleeding order: first, a schwa is epenthesized between the stem-final nasal and the morpheme /-n/; second, the /-

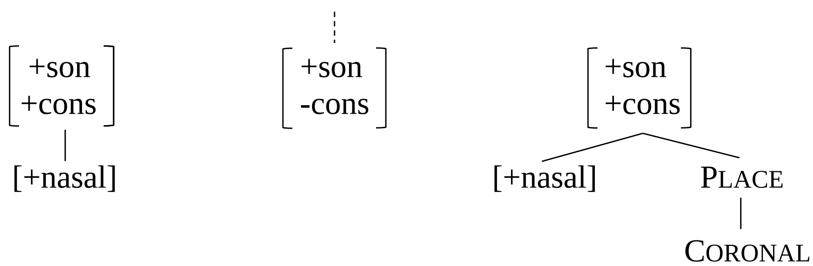
[50] I do not have data with a labial or dorsal nasal suffix, such as /-m/ or /-ŋ/. I predict that if these suffixes existed, they would not delete, since no other labials or dorsals fail to surface in my corpus.

n/ deletes via NCD (to be revised below).[51] The rule of Schwa Epenthesis in (23a) states that a schwa is epenthesized between two nasals; (23b) shows this process in terms of features.

(23) Schwa Epenthesis

a. Ø → [ə] / [+nasal] ___ [+nasal]

b.



In (23b), a [+nasal] consonant precedes the coronal nasal /n/. This is the context for Schwa Epenthesis, which is shown by the insertion of a [+son, -cons] segment with no place features. Schwa attaches to a higher constituent (notated with the dotted line).

Schwa Epenthesis is motivated by the Sonority Sequencing Principle (SSP) (see Selkirk 1984, Blevins 1995, and Zec 2007, among others). The SSP is given in (24).

(24) **Sonority Sequencing Principle**: A syllable rises in sonority from the onset to the highest point, the nucleus, and falls in sonority to the coda.

[51] Superficially, it looks like the data in (22a) are the same as in Dutch, where a nasal deletes after a schwa (see Booij 1995:140). However, as I show in 4.3.3, Nasal Consonant Deletion occurs after many vowels, not only after a schwa. Thus, I do not consider this to be the same process as that cited for Dutch.

The SSP works in tandem with a language or dialect's sonority hierarchy, which is a scale that classifies sounds based on their sonority. I adopt the sonority hierarchy from Clements (1990) in (25).

(25) General Sonority Hierarchy

vowels > glides > liquids > nasals > obstruents

In the data in (22a), the underlying representations have adjacent nasals; for example, *schwimmen* is underlyingly /ʃvɪm-n/. The nasal sequence /m-n/ cannot be parsed as a coda without violating the SSP in (24), and hence those sounds cannot surface as [mn]. Instead, the adjacent nasals are made pronounceable by Schwa Epenthesis in (23). When a sequence does not violate the SSP, such as the word *kauen* [kaʊ̯n] 'to chew', which ends in a vowel-nasal sequence, no repair (i.e. Schwa Epenthesis) is necessary.

Word-final sequences like /tn/ in the word *raten* from (22b) also violate the SSP because nasals are more sonorant than obstruents. Such sequences undergo a different repair by which the nasal is made syllabic. This rule is given in (26).

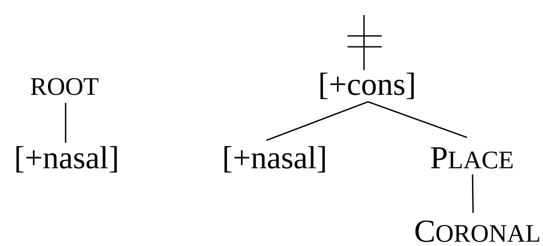
(26) **Sonorant Syllabification:** When a sonorant cannot be parsed into a preceding syllable, it is assigned a nucleus.

When Sonorant Syllabification applies, the preceding consonant is re-syllabified as the onset of that syllable. Thus, a word like *raten* is pronounced [ʀo.tn̩]. Sonorant

Syllabification also applies to word-final obstruent-liquid sequences; these will be discussed in chapter 5.

The data in (22a) show overapplication opacity; that is, after schwa epenthesizes, the final /n/ deletes. In contrast to the derivation of RVN and NCD in (21), which showed self-destructive feeding, Schwa Epenthesis and NCD are in a counterbleeding order. To account for this additional context of final /n/ deletion, NCD is revised in (27). This rule states that a coronal nasal deletes after a ROOT specified as [+nasal].

(27) Nasal Consonant Deletion (final version)



The [+nasal] ROOT which triggers Nasal Consonant Deletion can be either a vowel (as in the first version given in (20)), or a consonant. This rule applies not only in nasal-nasal sequences, but also in nasal-schwa-nasal sequences because schwa has no dependent features of the ROOT.[52] Given that representation for schwa, the two [+nasal] autosegments in (27) are adjacent on the same tier, even if schwa is between them. In a word such as *singen* in (22a), there is a stage in the derivation with the sequence [-ŋən]; in terms of dependent features, the [+nasal] node of [ŋ] and [n] are adjacent.[53]

[52] This is different from nasal-full vowel-nasal sequences (e.g. /nan/), where the nasals would not be adjacent because full vowels like /a/ have dependent features.
[53] In the data in (22a), schwa is not shown as nasalized; that is, it does not undergo RVN in (17). Epenthetic schwa in verb forms is only nasalized in a small number of tokens in my corpus. Nasalized schwa in this

A derivation illustrating the interaction between Schwa Epenthesis (SE) and NCD is given in (28a).

(28) Derivation of SE and NCD
with *schwimmen*

a.	Counterbleeding (Overapplication)	b.	Bleeding
UR	/ʃvɪm-n/	**UR**	/ʃvɪm-n/
SE	ʃvɪmən	**NCD**	ʃvɪm
NCD	ʃvɪmə	**SE**	----
PR	[ʃvɪ.mə]	**PR**	*[ʃvɪm]

As mentioned above, these rules are in a counterbleeding order; this is the correct relationship between the two rules in question because the reversal of the rules produces a bleeding order, as in (28b). Thus, this overapplication opacity exhibits a counterbleeding order and not a self-destructive feeding order (cf. (21)).

4.4 Progressive Nasal Place Assimilation and Dorsal Fricative Assimilation

As discussed in Chapter 3, RG has a rule of Dorsal Fricative Assimilation (DFA), whereby the dorsal fricative /x/ is realized as velar [x] after a back vowel and as palatal [ç] after a front vowel. In section 4.2.2 I also discussed how the nasal /n/ receives place from a

context is not the regular output, so it is not explored here. I do not provide spectrograms for the (non)application of vowel nasalization of schwa, as this is difficult to see, given the interaction of formants in nasalized vowels. For discussion on issues concerning formant reading for nasal(ized) vowels, see Reetz & Jongman (2009) and Johnson (2012). For discussion of variation and optionality, such as nasalization of schwa, see chapter 7. Even in instances where schwa is nasalized, the analysis need not change because the following generalization still holds: a coronal nasal deletes after a ROOT marked as [+nasal].

preceding consonant via Progressive Nasal Place Assimilation (PNPA). Data showing both of these processes are given in (29): (29a) shows /n/ surfacing as velar [ŋ] following velar [x], and (29b) likewise shows velar [ŋ] (from /n/) following palatal [ç] (via DFA).

(29)	Data for NPA and DFA		
	Ramsau German	**Standard German**	**English**
a.	Velar Fricative		
	[vo.xŋ̩]	*Woche*	‘week’
b.	Palatal Fricative		
	[ʀi.çŋ̩]	*riechen* (INF.)	‘to smell’
	[tse.çŋ̩]	*Zeh*	‘toe’
	[ʃpʀe.çŋ̩]	*sprechen* (INF.)	‘to speak’
	[ʃtɛɐ̯n.tsaɪ̯.çŋ̩]	*Sternzeichen*	‘zodiac sign’

It is important to note that in (29b), the palatal fricative [ç] is followed by velar [ŋ] (and not palatal [ɲ], which is not a RG sound). I clarify first the phonetic facts and then conclude this section by giving a phonological analysis of the data.

One way to determine which nasal surfaces in (29) is to examine spectrograms for the nasals in question. According to Reetz & Jongman (2009:195), anti-formants appear in spectrograms for nasal consonants, according to where the nasal is articulated in the oral cavity. These authors give several average ranges of measurements for determining nasals, though they note that exact measurements can vary because of many factors:

(30) Nasal Anti-Formants (from Reetz & Jongman 2009:195)

[m]	750-1,250 Hz
[n]	1,450-2,200 Hz
[ŋ]	above 3,000 Hz

While Reetz & Jongman (2009) do not specify an anti-formant range for the palatal nasal [ɲ], based on their discussion, it should measure somewhere between 2,000-3,000 Hz because of its place of articulation between alveolar and velar.[54]

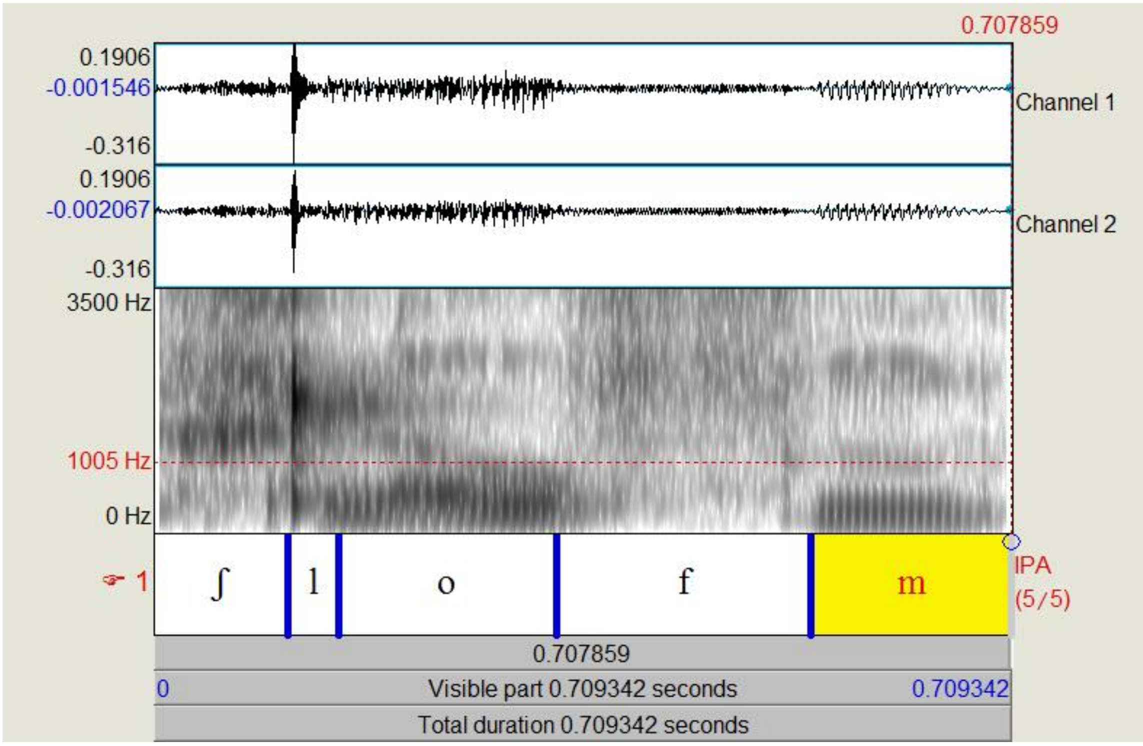
The following figures show wave forms and spectrograms for one speaker producing the three RG nasal consonants, which have undergone place assimilation to a preceding fricative. This speaker's anti-formants tend toward the lower end of the measurement ranges in (30), particularly for [n] and [ŋ]. The relevant anti-formants can be seen in each spectrogram with the horizontal dotted line and corresponding measurement to the left of the spectrogram. In (31), the [m] in *schlafen* measures around 1,000 Hz, which is right in the middle of the range given in (30). The [n] in *lesen* in (32) is about 1,300 Hz, which is just lower than the range from (30). Finally, the [ŋ] in *Woche* in (33) and in *sprechen* in (34) is about 2,700 Hz, which is slightly lower than the average measurement in (30). What is particularly important, however, is not that this speaker has lower measurements for [ŋ], but rather what the measurement is for the velar nasal, depending on the sound which precedes it (i.e. the sound from which [ŋ] gets its place). It can be observed that the [ŋ] following the velar fricative [x] in (33) has the exact same measurement as the [ŋ] following the palatal fricative [ç] in *sprechen* in (34). Thus, these phonetic data explicitly show that the velar nasal which assimilates to a RG dorsal fricative is, in fact, velar and not palatal.[55]

---

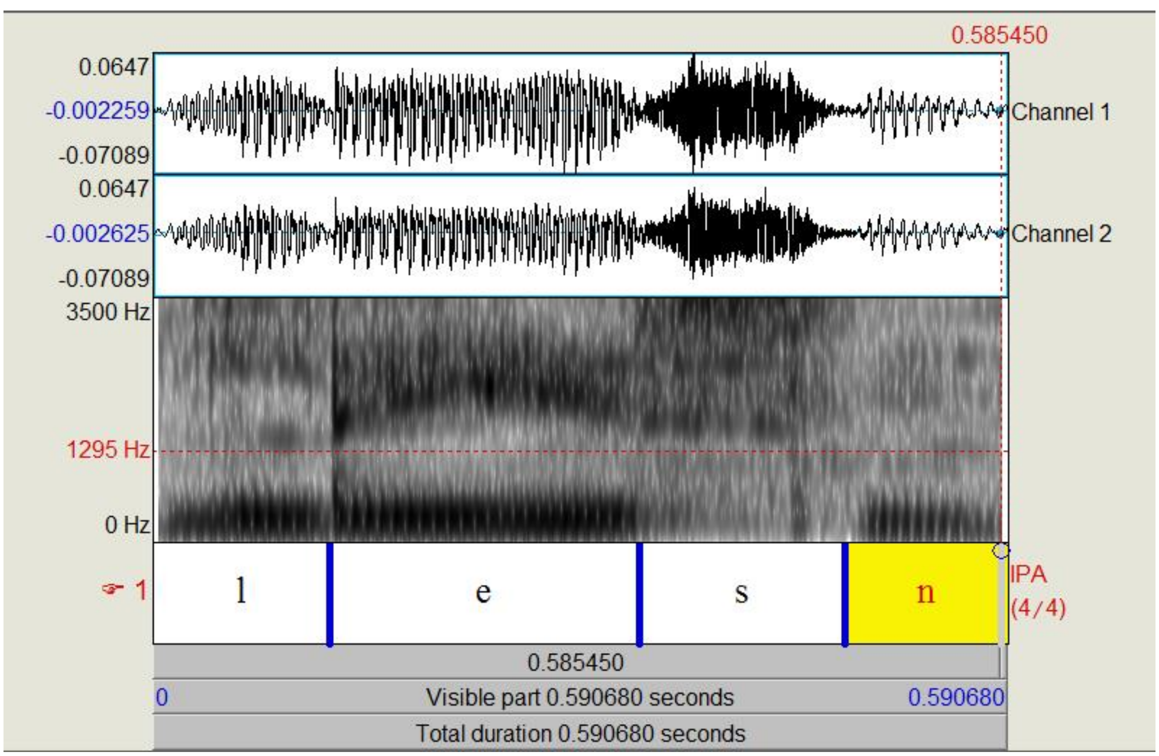
[54] See also Johnson (2012:191) for similar measurements and discussion of anti-formants.

[55] Ken de Jong (p.c.) doubts the validity of this argumentation. I prefer to leave questions concerning nasal antiformants open for further study.

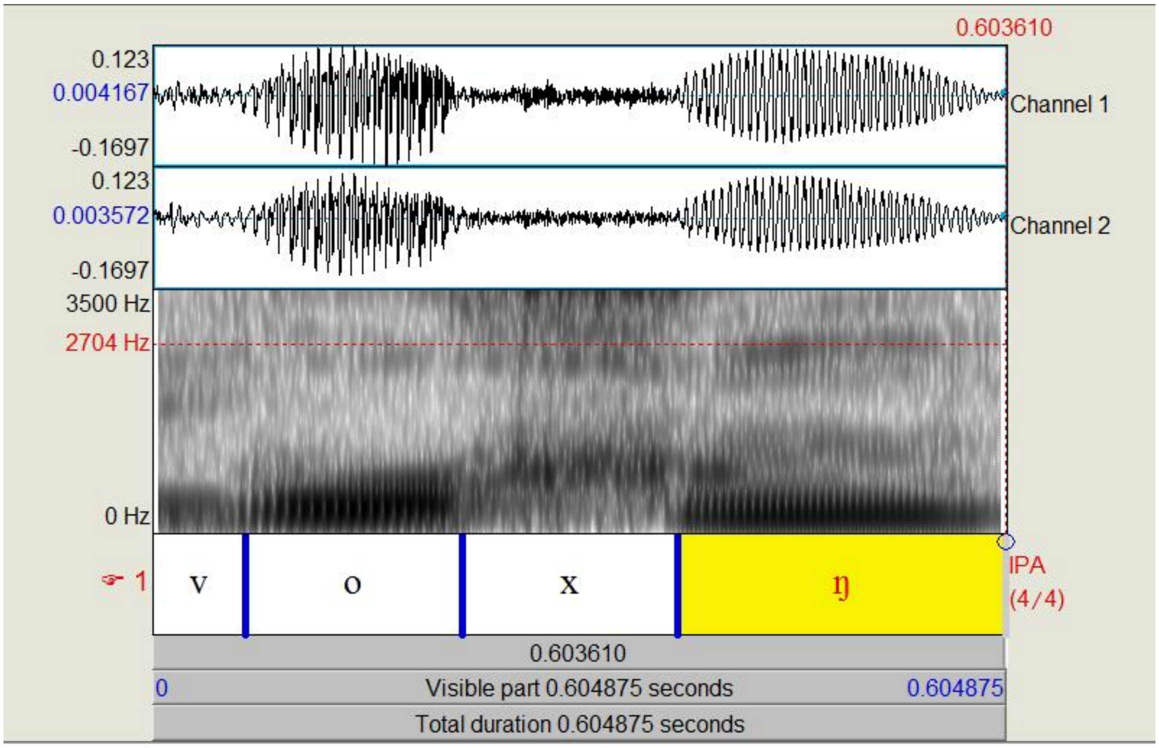
(31) *schlafen* [ʃlo.fm̩] 'to sleep'



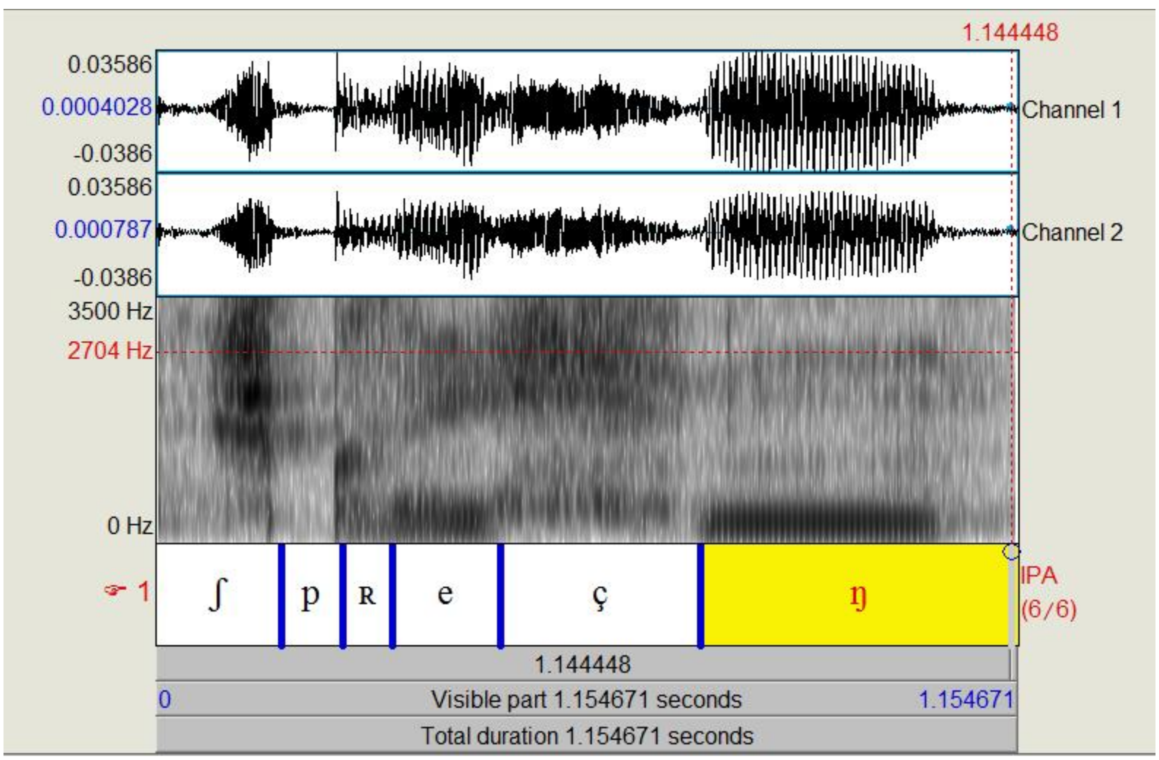
(32) *lesen* [le.sn̩] 'to read'



(33) *Woche* [vo.xŋ̩] ‘week’



(34) *sprechen* [ʃpʀe.çŋ̩] ‘to speak’

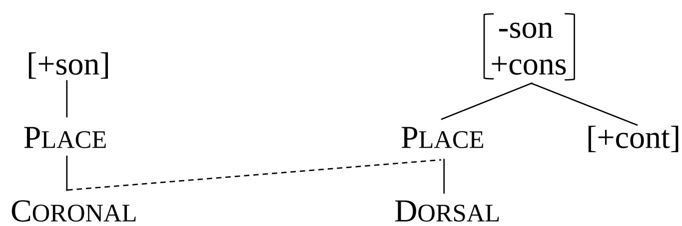


Features for the dorsal fricatives /x/ and [ç], as well as DFA (from chapter 3) are repeated in (35-36).

(35) Features of /x/ and [ç]

	/x/	[ç]
[sonorant]	–	–
[consonantal]	+	+
[continuant]	+	+
PLACE	✓	✓
CORONAL		✓
DORSAL	✓	✓

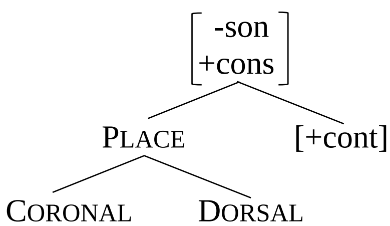
(36) Dorsal Fricative Assimilation



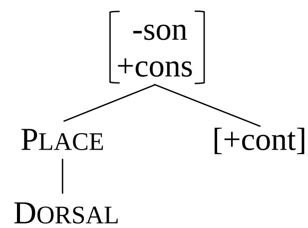
Recall that DFA is an assimilatory process which spreads the CORONAL node of a sonorant onto PLACE of a following dorsal fricative /x/. The DORSAL node does not delete in palatal [ç]; rather, the palatal fricative has a complex place specification (cf. Robinson 2001, Glover 2014, and discussion in chapter 3). I argue that the palatal fricative is coronal and dorsal, as in (37a), and not simply dorsal, as in (37b). Thus, I follow authors such as Robinson (2001) and Glover (2014). This is different from other authors who see German palatals as simplex dorsal segments: Hall (1992b:222) analyzes palatals as dorsal and [-back], while Wiese (1996:212) sees palatals as dorsal and [+front]. In the cross-linguistic literature, palatals are often analyzed as simplex coronals; see, for example, Hyman (1973), Clements (1976), Lahiri & Blumstein (1984), Keating (1988, 1991), Hume (1992, 1996), and Hall (1997, 2007b). It is shown below why a realization of the palatal fricative as neither simplex coronal nor simplex dorsal will work for the RG data.

(37) Representations for the Dorsal Fricative

a. Corono-Dorsal Segment



b. Dorsal Segment

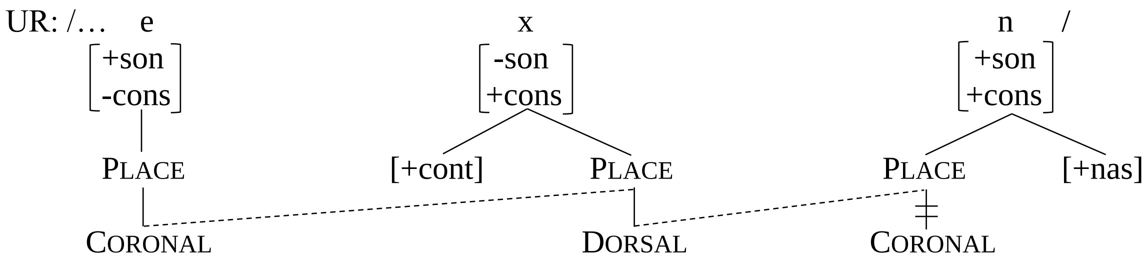


Evidence that palatal fricatives are complex (corono-dorsal) segments is based on data from (29b), where in a word like *sprechen*, both DFA and PNPA apply: Even though the palatal fricative is specified with a CORONAL node via DFA, it still must also be specified as DORSAL because DORSAL spreads to the following /n/, creating a velar nasal in the output (cf. the spectrogram for *sprechen* in (34)).

Both DFA and PNPA are shown applying to the last three ROOT nodes of the word *sprechen* in (38).[56]

[56] For space concerns, not all features for the vowel are given; i.e. [ATR] and [high] have been omitted so that the processes concerning place are prominent. [e] is specified as [+ATR] and [-high], as discussed in chapter 3.

(38) PNPA and DFA for *sprechen*



In (38), the CORONAL node from /e/ spreads rightward onto PLACE of /x/ (via DFA). This produces the complex segment of [ç]. The DORSAL node of /x/ then spreads rightward onto the CORONAL /n/, and the CORONAL node de-links (via PNPA). Data like *sprechen* provide evidence that the palatal fricative is a complex sound with both DORSAL and CORONAL as daughters of PLACE.

Under my analysis for the features of the palatal fricative, seemingly opaque outputs (i.e. *sprechen*, etc.) are actually transparent. That is, the DORSAL node (which is the trigger for PNPA) is present in the segment which is the target of DFA (i.e. DORSAL /x/ and not CORONAL */ç/). Therefore, by analyzing palatal [ç] as both CORONAL and DORSAL, the output of PNPA and DFA is not opaque, but rather transparent. In addition to this, it does not appear to matter which rule occurs first (that is, DFA or PNPA), because the DORSAL node of /x/ never de-links. It is important to note that in (38), the daughter node of PLACE must spread via PNPA, not the PLACE node itself. If PLACE were to spread from [ç] to /n/, then one would expect the palatal nasal [ɲ] to surface, but this is not the case, given (34).

The discussion and analysis of dorsal fricatives and DFA are important because they shed light on which features must be assigned to certain vowels and consonants (cf.

sections 3.2.2 and 3.3.2). For example, formalizing DFA as the spreading of CORONAL is an elegant way to show that vowels and consonants have the same types of place features. That is, both vowels and consonants have features for CORONAL, DORSAL, and LABIAL, instead of vowels having separate classifications such as [front], [back], or [round] (see Hall 2007b:321-330 for discussion of these place features).

4.5 Self-Destructive Feeding and Opacity

As shown in data sets and analyses above, there are several cases of overapplication opacity involving RG nasals. In the case of SE and NCD (see the derivation in (28)), there is overapplication opacity which is the product of a counterbleeding rule order. These data and analysis are uncontroversial, as phonological literature is clear that overapplication opacity is the result of a counterbleeding order (see discussion in chapter 1, as well as Baković 2007, 2011 and sources therein).

Other examples of overapplication opacity concern the interaction of assimilatory rules with deletion rules, where the latter eliminate the context (trigger) for the former. See, for example, derivations for PNPA and VSD in (11) and RVN and NCD in (21). I show that these rules cannot be in a counterbleeding order because reversal of them does not produce a bleeding order, but rather a counterfeeding order; thus (11) and (21) show examples of feeding rule orders which produce overapplication opacity. This is precisely what Baković (2007, 2011) describes as self-destructive feeding, where "an earlier rule feeds a later rule that in turn crucially changes the string such that the earlier rule's application is no longer justified" (Baković 2011:59-60).

Baković (2007, 2011) shows examples of self-destructive feeding orders which have been misidentified in the literature as counterbleeding, simply because they resulted in overapplication opacity. As in the case cited in Baković (2011:60), the two deletion rules in RG concerning nasals "crucially change part of the environment that justified the prior application of [assimilations]". That is, the RG data exhibit overapplication opacity which is not caused by counterbleeding, but rather by self-destructive feeding on environment. Baković (2007) cites only two examples of self-destructive feeding in Turkish; thus, my data and analysis lend support to Baković's claim for such opaque data to be analyzed with a feeding rule ordering.

If one were to reanalyze the rules above in such a way that they apply in a counterbleeding order, then the rules would necessarily have to be generalized more than the phonology truly allows, particularly concerning VSD in (10). That is, a counterbleeding rule order would require a more general rule of deletion, where all voiced stops delete before a nasal. However, as discussed in section 4.2.3, there are surface examples, such as *irgendein* [iɐ̯.gn̩t.aɪ̯̃] 'any' in (13b), which cannot be accounted for with a more general rule.

4.6 Conclusion

In this chapter, I have examined several processes involving nasal consonants in RG, and I have shown how certain RG rule interactions concerning nasals result in opaque outputs due to overapplication. Specifically, I have presented examples of overapplication which is the product of counterbleeding (as is typical in the literature), as well as self-destructive feeding. The latter data and analyses are important because they help to establish this relatively new theory in the phonological literature.

This chapter also explored the interactions of DFA with PNPA, which resulted in an example of transparency, given the features assigned the palatal fricative. The figure in (38) provides another argument for the place features of dorsal fricatives posited in chapter 3.

CHAPTER 5

RG LIQUIDS AND VOCALIZATION

5.1 Introduction

In BG, there is a productive process of Liquid Vocalization of /l/ (first discussed by Schmeller 1821:107-110; see also Kranzmayer 1956:119-121, Zehetner 1985:55-66, Merkle 2005:23-24) and of /ʀ/ (see Hall 1992b, 1993 and Wiese 1996 for SG), whereby coda /l/ and /ʀ/ are realized as the glides [ɪ̯] and [ɐ̯], respectively. Representative examples of this are given in (1a,b). When an underlying vowel which precedes a vocalized /l/ is front, this vowel undergoes a dissimilation and becomes a back vowel. This is referred to as Vowel Dissimilation, and a representative example is given in (1c).

(1) Liquid Vocalization and Vowel Dissimilation

	Ramsau German	Standard German	English
a.	[meɐ̯ ~ me.ʀə]	*Meer ~ Meere*	‘sea(s)’
b.	[ʃpuɪ̯n ~ ʃpu.lɐ]	*spulen ~ Spuler*	‘to wind ~ winder’
c.	[ʃpuɪ̯n ~ ʃpi.lɐ]	*spielen ~ Spieler*	‘to play ~ player’

Rules for Liquid Vocalization and Vowel Dissimilation are given in (2). Vocalization of /ʀ/ and /l/ are given separately as (2a) and (2b); however, these represent one combined rule of Liquid Vocalization, which will be further discussed and elaborated upon in the following sections.

(2) Liquid Vocalization and Vowel Dissimilation

a.	/ʀ/	→	[ɐ̯]	/	V ___ (C)]$_\sigma$
b.	/l/	→	[ɪ̯]	/	V ___ (C)]$_\sigma$
c.	/i, ɪ, e, ɛ/	→	[u, ʊ, o, ɔ]	/	___ [ɪ]

The rules discussed in this chapter are transparent (i.e. in feeding and bleeding relationships). The main focus of the current chapter is on analysis of (transparent) applications of RG liquids and how to account for their unique allophones.

The chapter is organized as follows: I present the distribution of RG liquids in section 5.2, including data where /l/ and /ʀ/ either surface as consonantal [l] and [ʀ] or as the glides [ɪ̯] and [ɐ̯]. In section 5.3, I give an analysis within the framework of Feature Geometry, which accounts for Liquid Vocalization and Vowel Dissimilation, as well as how these processes interact with Dorsal Fricative Assimilation and Progressive Nasal Place Assimilation. I examine additional data and processes concerning RG Liquids in section 5.4. In section 5.5, I present other examples of Vocalizations in Germanic languages, both synchronic and diachronic. I conclude in section 5.6.

5.2 The Distribution of the allophones of RG /l/ and /ʀ/

5.2.1 Onset [l] and [ʀ]

The data in (3-5) illustrate that /l/ and /ʀ/ are realized as [l] and [ʀ] before a vowel. The pre-vocalic liquids in question are always in the onset; onset /l/ and /ʀ/ can be word-initial in (3), the right-most member of a word-initial consonant cluster in (4), or a word-internal onset in (5), where the word-internal liquids are parsed in the onset, just like any C in VCV.

There are no restrictions on the type of vowel which follows these liquids; thus, the vowel can be high, mid, or low, front or back, rounded or unrounded, diphthong, or monophthong. There are no restrictions involving word-class; hence, /l/ and /ʀ/ can occur in nouns, verbs, or adjectives.[57] /l/ and /ʀ/ also occur in the onset in other word classes, i.e. prepositions, conjunctions, etc. The data here and below, however, focus on nouns, verbs, adjectives, and adverbs because these are the most common words.

(3) Word-Initial Liquids

Ramsau German	**Standard German**	**English**
[lɪçt]	*Licht*	‘light’
[ʀo.man]	*Roman*	‘novel’

(4) Consonant Cluster Liquids

Ramsau German	**Standard German**	**English**
[ʃlo.fm̩]	*schlafen* (INF.)	‘to sleep’
[ʃpʀe.çn̩]	*sprechen* (INF.)	‘to speak’

(5) Word-Internal Liquids

Ramsau German	**Standard German**	**English**
[se.lɪk]	*selig*	‘blessed’
[ʃtu.ʀɐ]	*sturer* (M. NOM.)	‘stubborn’

The following sections show that not all underlying liquids surface as consonantal [l] or [ʀ]; rather, many instances of post-vocalic liquids are vocalized.

[57] /l/ and /ʀ/ do not occur as [l] or [ʀ] word-internally in verb stems (i.e. when a verb stem ends in /l/ or /ʀ/) because there are no vowel-initial verbal suffixes which enable liquids to be parsed as an onset. The liquid in that context undergoes Liquid Vocalization, as will be shown in section 5.2.2. For example, a verb like *spulen* /ʃpul-n/ is pronounced as [ʃpuɪ̯n]. See the discussion in the next section.

5.2.2 Coda /l/ and /ʀ/

The data in (6) display alternations between [l] and the high front glide [ɪ̯]. The first word in each alternating pair of (6a) is a verb in which /l/ surfaces in the coda as [ɪ̯], whereas the second word in each pair is a de-verbal noun, where /l/ is in a syllable onset, and thus surfaces as [l]. For example, in the pair *malen* ~ *Maler* in (6a), the /l/ surfaces in the coda as [ɪ̯] in the verb and as [l] in the onset of the second syllable in the noun. The infinitive marker in RG is pronounced as [n], and not [ən] (or [n̩]), as in SG. This being the case, the stem-final /l/ in each verb is in the coda. In (6b), alternations in adjectives are presented. The first word of each pair ends in /l/, which is vocalized to [ɪ̯], and the second word in each pair shows an alternating form with a syllable-initial [l]. For example, in the pair *voll* ~ *voller*, *voll* has [ɪ̯] in the coda, while the second syllable of *voller* has [l] in the onset. Finally, (6c) illustrates a noun where [l] and [ɪ̯] alternate in singular and plural forms. All of the data in (6) contain an underlying back stem vowel; if a front vowel precedes, then there is an added complication which I discuss below.

(6) [l] ~ [ɪ̯] after an underlying back vowel

	Ramsau German	Standard German	English
a.	Verb (INF.) ~ Noun		
	[moɪ̯n ~ mo.lɐ]	*malen ~ Maler*	'to paint ~ painter'
	[ʀoɪ̯n ~ ʀo.lɐ]	*rollen ~ Roller*	'to roll ~ roller'
	[ʃpuɪ̯n ~ ʃpu.lɐ]	*spulen ~ Spuler*	'to wind ~ winder'
b.	Adjective ~ Adjective		
	[ɔ̃.mɔɪ̯ ~ ɔ̃.mɔ.lɪk]	*einmal ~ einmalig*	'once ~ one-time'
	[fɔɪ̯ ~ fɔ.lɐ]	*voll ~ voller*	'full ~ fuller'
c.	Nouns SG. ~ PL.		
	[suɪ̯n ~ su.lə]	*Suhlen ~ Suhle*	'wallow ~ wallows'

The output of Liquid Vocalization of /l/ ([ɪ̯]) is a non-syllabic element; it is the second part of a diphthong, which I define as a syllabic vowel plus a non-syllabic vowel (glide), which are tautosyllabic. The glide of a diphthong may thus be in the nucleus (as the diphthongs discussed in chapter 3) or in the coda (such as those in (6)).[58]

The data in (7) likewise show alternations between consonantal [ʀ] and vocalic [ɐ̯], where coda /ʀ/ is realized as [ɐ̯] in noun forms in (7a), verbs in (7b), and adjectives in (7c).

(7)	[ʀ] ~ [ɐ̯]		
	Ramsau German	**Standard German**	**English**
a.	Nouns SG. ~ PL.		
	[pə.piɐ̯ ~ pə.pi.ʀə]	*Papier ~ Papiere*	‘paper(s)’
	[meɐ̯ ~ me.ʀə]	*Meer ~ Meere*	‘sea(s)’
	[tɔɐ̯ ~ tɔ.ʀə]	*Tor ~ Tore*	‘gate(s)’
b.	Verb (INF.) ~ Noun		
	[fə.liɐ̯n ~ fə.li.ʀɐ]	*verlieren ~ Verlierer*	‘to lose ~ loser’
	[leɐ̯n ~ le.ʀɐ]	*lehren ~ Lehrer*	‘to teach ~ teacher’
	[fɔɐ̯n ~ fɔ.ʀɐ]	*fahren ~ Fahrer*	‘to drive ~ driver’
	[boɐ̯n ~ bo.ʀɐ]	*bohren ~ Bohrer*	‘to drill ~ drill’
c.	Adjectives		
	[klɔɐ̯ ~ ə klɔ.ʀɐ di.ə.mant]	*klar ~ ein klarer Diamant*	‘clear ~ a clear diamond’
	[ʃtuɐ̯ ~ ə ʃtu.ʀɐ e.sl̩]	*stur ~ ein sturer Esel*	‘stubborn ~ a stubborn donkey’

In the alternations in (6-7), /l/ and /ʀ/ are the underlying sounds which become [ɪ̯] and [ɐ̯] in coda position. I refer to this process below as Liquid Vocalization. For now, I adopt the linear rule of Liquid Vocalization for /ʀ/ and /l/ in (2), which I restate in (8). (8a,b) are reformulated as a single process in terms of features in section 5.3.

[58] See section 5.3.1 for more discussion of the structure of RG diphthongs.

(8) Liquid Vocalization (repeated from 2a,b):

a. /ʀ/ → [ɐ̯] / V ___ (C)]$_\sigma$

b. /l/ → [ɪ̯] / V ___ (C)]$_\sigma$

The optional consonant (C) means that liquids vocalize in absolute final position, as in examples like *voll* [fɔɪ̯] in (6b) or before a coda consonant, such as *spulen* [ʃpuɪ̯n] in (6a).

The data in (9) illustrate alternations between [l] and [ɪ̯], but the vocalic contexts (that is, the vowel which precedes vocalized /l/) in these data are less straightforward than in the examples above. While the data in (6) all have underlying back vowels preceding an /l/ which vocalizes, the data in (9) have underlying front vowels which surface as either front or back vowels. In data set (9), it can be observed that the front vowel surfaces before [l] and the back vowel before the vocalized allophone of /l/. I argue below that the front vowel is underlying and that the change to a back vowel is accomplished by the rule referred to earlier as Vowel Dissimilation. For example, in the word *Spieler* in (9a), the underlying high front stem vowel /i/ surfaces as [i], but that same vowel surfaces as [u] before the vocalized /l/ in *spielen*. This front ~ back vowel alternation can also be seen in the mid vowels. For example, in the pair *erzählen* ~ *Erzähler* in (9a), the underlying front mid vowel /e/, which appears as [e] in *Erzähler*, alternates with the back mid vowel [o] after the vocalized /l/ in *erzählen*. The stem vowels in (9) are underlyingly front vowels which surface as back vowels (i.e. a vowel like /i/ surfaces as [u]), and not the other way around; if back vowels were underlying, the [u] in the third example in (6a), *Spuler*, would be expected to surface as [i], i.e. *[ʃpi.lɐ].

(9)	[l] ~ [ɪ̯] after an underlying front vowel		
	Ramsau German	**Standard German**	**English**
a.	Verb (INF.) ~ Noun		
	[ʃpuɪ̯n ~ ʃpi.lɐ]	*spielen ~ Spieler*	'to play ~ player'
	[ɛɐ̯.tsoɪ̯n ~ ɛɐ̯.tse.lɐ]	*erzählen ~ Erzähler*	'to narrate ~ narrator'
	[heɐ̯.ʃtɔɪ̯n ~ heɐ̯.ʃtɛ.lɐ]	*herstellen ~ Hersteller*	'to make ~ maker'
b.	Nouns SG. ~ PL.		
	[ʃpuɪ̯ ~ ʃpi.lə]	*Spiel ~ Spiele*	'game ~ games'
	[mo.dɔɪ̯ ~ mo.dɛ.lə]	*Modell ~ Modelle*	'model ~ models'
c.	Noun ~ Adjective		
	[vʊɪ̯n ~ vɪ.lɪk]	*Wille ~ willig*	'will ~ willing'

In the data in (9), the underlying front stem vowel becomes back (i.e. /i/ is realized as [u], /ɪ/ as [ʊ], /e/ as [o], and /ɛ/ as [ɔ]) before an /l/ that has been vocalized in the coda. I see the vocalic change from front to back as a dissimilation because the vocalized /l/ is a front vowel.

In the data in (10-13), coda [ɪ̯] and [ɐ̯] which are derived from /l/ and /ʀ/ occur in post-vocalic consonant clusters, both word-finally and word-internally; these data are nouns, but the generalization holds for the language as a whole. In contrast to the examples in (6, 7, 9), there are no alternations between [ɪ̯] ~ [l] or [ɐ̯] ~ [ʀ] in the words in (10-13); I argue below that the coda [ɪ̯] in (10, 12) and coda [ɐ̯] in (11, 13) are derived synchronically from /l/ and /ʀ/. The consonant which follows the vocalized liquid can be a nasal, as in (10a) and (11a), or an obstruent, as in (10b) and (11b).

(10)	Word-Final Consonant Cluster /l/		
	Ramsau German	**Standard German**	**English**
a.	Before Nasals		
	[kɔn.suɪ̯n]	*Konsuln*	'consulate'
	[fʊɪ̯m]	*Film*	'film'
	[ɔɪ̯m]	*Alm*	'alpine pasture'

b.	Before Obstruents		
	[vɔɪ̯t]	*Volt*	‘volt’
	[huɪ̯f]	*Hilfe*	‘help’
	[sɔɪ̯ts]	*Salz*	‘salt’

(11)	Word-Final Consonant Cluster /ʀ/		
	Ramsau German	**Standard German**	**English**
a.	Before Nasals		
	[ʃiɐ̯m]	*Schirm*	‘screen’
	[ʃtɛɐ̯n]	*Stern*	‘star’
	[hɔɐ̯n]	*Horn*	‘horn’
b.	Before Obstruents		
	[vɛɐ̯k]	*Werk*	‘work’
	[dɔɐ̯f]	*Dorf*	‘village’
	[ʃmɛɐ̯ts]	*Schmerz*	‘pain’

The data in (12-13) display /l/ and /ʀ/ in word-internal consonant clusters in the coda of the first morpheme of compound words. In each of these examples, the underlying /l/ or /ʀ/ of the consonant cluster is realized as [ɪ̯] or [ɐ̯].

(12)	Word-Internal Consonant Cluster /l/		
	Ramsau German	**Standard German**	**English**
a.	Before Nasals		
	[heɪ̯m.bʊʃ]	*Helmbusch*	‘plume’
	[ɔɪ̯m.hɪ.tl̩]	*Almhütte*	‘alpine cabin’
	[uɪ̯.mɪn.hɔɪ̯ts]	*Ulmenholz*	‘elm wood’
b.	Before Obstruents		
	[ɔɪ̯p.tʀaʊ̯m]	*Alptraum*	‘nightmare’
	[fɛɪ̯s.vɔnt]	*Felswand*	‘rock face’
	[puɪ̯ts.bə.foɪ̯]	*Pilzbefall*	‘fungal decay’

(13) Word-Internal Consonant Cluster /ʀ/

	Ramsau German	**Standard German**	**English**
a.	Before Nasals		
	[ʃtɛɐ̯n.tsaɪ̯.çn̩]	*Sternzeichen*	'zodiac sign'
	[hɔɐ̯n.haʊ̯t]	*Hornhaut*	'callus'
	[ɔɐ̯m.ban.tl̩]	*Armband*	'bracelet'
b.	Before Obstruents		
	[viɐ̯t.ʃaft]	*Wirtschaft*	'economy'
	[bə.dɔɐ̯fs.fɔɪ̯]	*Bedarfsfall*	'case of need'
	[ʃtʊɐ̯ts.fluk]	*Sturzflug*	'nosedive'

Another example of /l/ which never surfaces as [l] is in conjugated forms of verbs, as in (14). Here, the stem ends in /l/, which always surfaces as the vocalized form in the singular and plural present tense forms of the verb *wollen*. The underlying form for the singular stem is /vɪl/,[59] and the plural form is /vɔl/.

(14) Liquid Vocalization in *wollen* 'to want'

	Ramsau German	**Standard German**
1 SG.	[vʊɪ̯]	*will*
2 SG.	[vʊɪ̯st]	*willst*
3 SG.	[vʊɪ̯]	*will*
1 PL.	[vɔɪ̯n]	*wollen*
2 PL.	[vɔɪ̯ts]	*wollt*
3 PL.	[vɔɪ̯n]	*wollen*

Compare these data to the alternating examples in (6-7), where there is no liquid alternant in verbal infinitives. There are no vowel-initial suffixes which could potentially attach to a verb stem ending in a liquid; thus, these verbal forms all surface with a vocalized liquid.[60]

[59] These forms also undergo Vowel Dissimilation.
[60] One might posit that Liquid Vocalization is orthographically driven. However, I consider these data to be representative of a phonological process, as children who are too young to read also vocalize liquids in the coda, as discussed above.

Because the data in (10-14) do not have an [l] or [ʀ] alternate, it could be argued that they are not true examples of vocalizations. That is, one could argue that the [ɪ̯] or [ɐ̯] in these examples does not derive from /l/ or /ʀ/, but that it is instead the second part of an underlyingly diphthong. For example, a word such as *Film* in (10a) might be represented underlyingly as /fʊɪm/ rather than /fɪlm/ (the latter is the same as SG). Evidence for an underlying /l/ in these data is that speakers often produce coda [l] in hypercorrect speech. Such hypercorrect speech occurs most often when they are clarifying something to a child or a non-native speaker, or when attempting to be extra clear in conversation with another dialect speaker. This is not simply a reflection of orthography, but rather an attempt to state something as clearly as possible.

The surface diphthongs in (10, 12, 14) can be compared to the surface diphthongs in (15), both of which have [ɪ̯] as the glide. In the latter examples, the diphthongs are underlying diphthongs. In contrast to the examples in (10, 12, 14), a speaker would never produce [l] for the second element of a diphthong in (15), even in hypercorrect speech. Words with underlying diphthongs (which are not derived from underlying /l/) are evidence against the argument that a word like *Film* in (10, 12, 14) has a diphthong underlyingly.

(15) RG Diphthongs

Ramsau German	**Standard German**	**English**
[e.fɔɪ̯]	*Efoi*	'ivy'
[laɪ̯t]	*Leute*	'people'

An additional argument for an underlying liquid in (10-14) comes from comparison with SG: Certain diphthongs only surface when there is a sequence of vowel and liquid in SG. For example, the diphthong [uɪ̯], as in the word *Hilfe* [huɪ̯f] from (10b), and in the alternating pair *spielen* ~ *Spieler* [ʃpuɪ̯n ~ ʃpi.lɐ], is never produced in morphemes which do not contain /l/ in SG. Similarly, there are no RG phonemic diphthongs which end in vocalized /ʀ/; every instance of [ɐ̯] in RG contains /ʀ/ in SG.

5.3 Analysis

The data presented in section 5.2 support the generalizations in (16) concerning the behavior of liquids in RG:

(16) Generalizations of RG Liquids:

a. Underlying /l/ and /ʀ/ surface as [l] and [ʀ] in a syllable onset.

b. Underlying /l/ and /ʀ/ surface as [ɪ̯] and [ɐ̯] in a syllable coda. They are the second, non-syllabic part of a diphthong.

c. An underlying front vowel surfaces as a back vowel when it precedes vocalized /l/.

These generalizations form the basis for sections 5.3.1 and 5.3.2, which provide analyses of Liquid Vocalization and Vowel Dissimilation.

5.3.1 Liquid Vocalization

Generalizations (16a,b) capture the distribution of underlying liquids and their vocalized allophones. The latter sounds derive from the former by a process of Vocalization, whereby an underlying consonant is realized on the surface as a vowel in coda position. Linear rules accounting for Liquid Vocalization from (2) are repeated in (17).

(17) Liquid Vocalization:

a. /ʀ/ → [ɐ̯] / V ___ (C)]$_{\sigma}$

b. /l/ → [ɪ̯] / V ___ (C)]$_{\sigma}$

As generalization (16b) clearly specifies, the context of Liquid Vocalization is a syllable coda. Thus, rules for syllabification which determine onsets, nuclei, and codas must be considered before a final analysis of Liquid Vocalization can be formulated. The steps for Syllabification (repeated from chapter 3) are as follows:

(18) Syllabification (adapted from Kenstowicz 1994:253-4)

a. Parse [-consonantal] segments in the nucleus.

b. Create onsets.

c. Create codas.

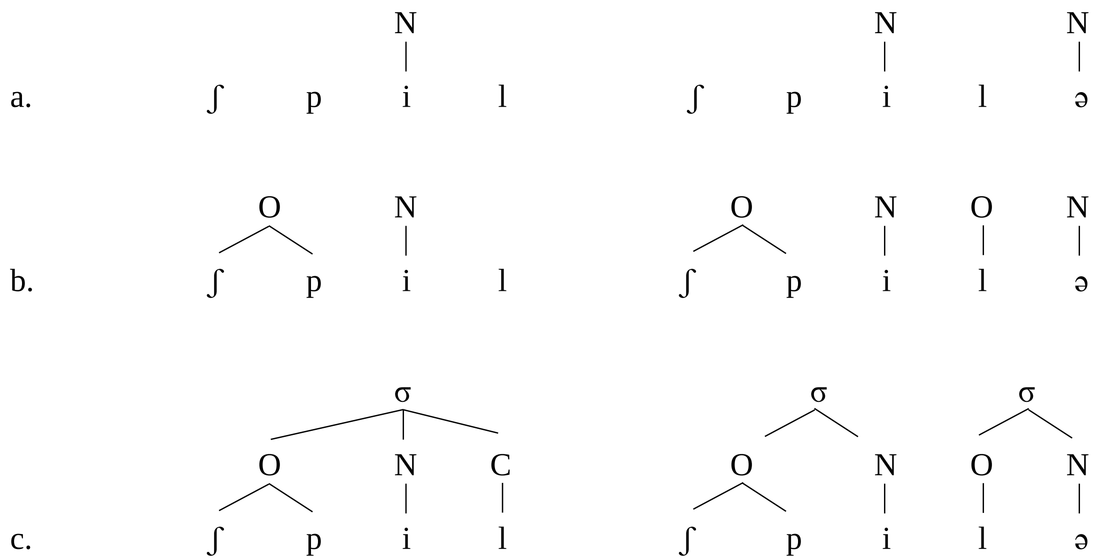
As discussed in chapter 3, underlying diphthongs have a nucleus in the underlying representation, which dominates both [-consonantal] segments. For all other vowels, including vowels in hiatus (see chapter 6), the nucleus is assigned via Syllabification (step (18a)).[61] Steps (18b) and (18c) can only create well-formed clusters (as defined in terms of sonority). See section 5.4.1 for discussion of syllabification and coda clusters.

These steps are applied to the RG words *Spiel* ‘game’ and *Spiele* ‘games’ from (9b) in (19). In step (19c), /l/ is in the coda in *Spiel*, while it is in an onset in *Spiele*; thus, the /l/ in *Spiel* undergoes Liquid Vocalization but the onset /l/ in *Spiele* does not.

[61] There is one suffix, presented in section 5.4.1, which also has an underlying nucleus; this is a marked case because all other non-diphthongal segments do not possess an underlying nucleus.

(19) Syllabification of *Spiel* and *Spiele*

UR /ʃpil/ /ʃpilə/

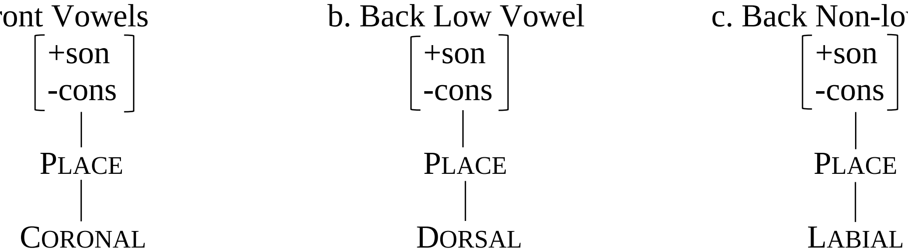


PR [ʃpuɪ̯] [ʃpi.lə]

The output of Syllabification creates the context for Liquid Vocalization, which is analyzed below using features (Sagey 1986, McCarthy 1988, among others). As discussed in chapter 1, front vowels are analyzed with a CORONAL node under PLACE (see Pulleyblank 1988 and other sources cited in chapter 1), and back vowels are analyzed with a DORSAL or LABIAL node under PLACE. Feature representations for vowels (from chapter 3) are repeated in (20).

(20) Feature Representations of Vowels

a. Front Vowels b. Back Low Vowel c. Back Non-low Vowels



Feature matrices for the segments [l] and [ɪ̯], as well as the other RG front monophthongs, are given in (21). All segments are marked as [+sonorant] and CORONAL. The feature which distinguishes /l/ and vocalized /l/ ([ɪ̯]) is [consonantal], where [l] is specified as [+consonantal] and [ɪ̯] as [-consonantal].

(21) Features of /l/ and [ɪ̯] vs. front monophthongs

	/l/	[ɪ̯]	/i/	/ɪ/	/e/	/ɛ/
[sonorant]	+	+	+	+	+	+
[consonantal]	+	–	–	–	–	–
[nasal]	–	–				
PLACE	✓	✓	✓	✓	✓	✓
[high]			+	+	–	–
CORONAL	✓	✓	✓	✓	✓	✓
ATR			+	–	+	–

As discussed in section 3.3.3, the glide in a diphthong (here, vocalized /l/) is distinct from phonetically similar RG monophthongs (especially /i/ and /ɪ/) in terms of the features [high] and [ATR]; that is, RG monophthongs are marked with '±' values for these features because they are distinctive, while the glide in a diphthong is an allophone of /l/. An /l/ which vocalizes produces no surface contrast between a [+ATR] derived [i] and a [-ATR] derived [ɪ]. The same holds for the feature [high]. Thus, as in underlying diphthongs, the glide [ɪ̯] is only specified for the place feature CORONAL. As discussed in chapter 3, /l/ is marked for [-nasal]; therefore, the glide derived from /l/ via Liquid Vocalization is also marked for [-nasal]. In this respect, the glide from L-Vocalization is different from offglides discussed in chapter 3 because those offglides do not bear [-nasal].

Feature matrices for the segments /ʀ/ and [ɐ̯], as well as the two other back non-labial monophthongs, are given in (22). Each segment is marked as [+sonorant] and (except for schwa) DORSAL. As was the case with the segments /l/ and [ɪ̯], the feature which distinguishes /ʀ/ and [ɐ̯] is [consonantal], where /ʀ/ is specified as [+consonantal] and [ɐ̯] as [-consonantal]. The difference between [ɐ̯] and [ə] is that schwa has no place features (see Wiese 1996:153, as well as chapter 3 and references therein), while [ɐ̯] is specified as DORSAL.

(22) Features of /ʀ/ and [ɐ̯] vs. Back non-Labial Monophthongs

	/ʀ/	[ɐ̯]	/a/	/ə/
[sonorant]	+	+	+	+
[consonantal]	+	–	–	–
[nasal]	–	–		
PLACE	✓	✓	✓	
DORSAL	✓	✓	✓	

Given the features in (21-22), I posit the following rule of Liquid Vocalization:

(23) Liquid Vocalization (final version):

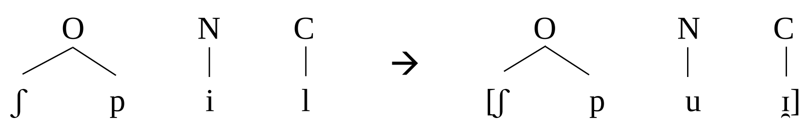
$$\begin{bmatrix}\text{+son}\\ \text{+cons}\\ \text{-nas}\end{bmatrix} \rightarrow [\text{-cons}] \quad / \quad \overset{\text{N}}{[\text{-cons}]}\ \overset{\text{C}}{\_\_\_}\ ([\text{+cons}])$$

Liquid Vocalization states that a liquid (non-nasal sonorant consonant) becomes [-consonantal] when it is in a coda (i.e. follows a nuclear vowel). Liquid Vocalization makes no reference to place because when a liquid vocalizes, it retains its place features.[62]

[62] There is one difference between coda vocalization of /ʀ/ in RG and SG: as Wiese (1996:253) notes, SG R-Vocalization is optional after short vowels; thus, a word like *Herr* 'gentleman' may be pronounced with consonantal /ʀ/ as [hɛʀ]. In contrast to SG, RG Liquid Vocalization of coda /ʀ/ is obligatory, even after a short vowel.

Diphthongs produced via Liquid Vocalization are part of the nucleus and coda. That is, Liquid Vocalization applies to a liquid which is in the coda, i.e. it follows a vowel (nucleus). Thus, the surface glide which is an underlying liquid must also be in the coda. Recall discussion of (19), which showed the steps of Syllabification for *Spiel* ‘game’; this syllabification is repeated on the left in (24), while the figure to the right of the arrow shows syllabification of the surface representation.

(24) *Spiel* [ʃpuɪ̯] ‘game’

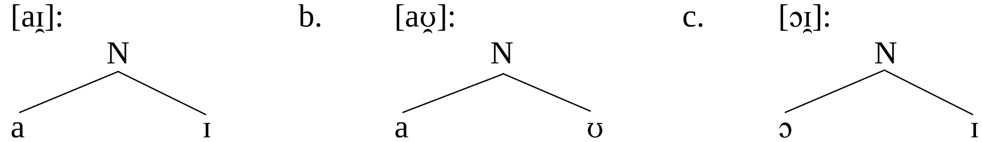


Syllabification does not change with application of Liquid Vocalization: underlying /l/ is syllabified in the coda, and its surface realization as a glide remains in the coda.

In this way, the glides produced from Liquid Vocalization are distinct from the offglides discussed in chapter 3, which were either in underlying diphthongs or produced via the process of Diphthongization. Recall that phonemic diphthongs have the syllable structure in (25), where both vowels are dominated by one nucleus. In phonemic diphthongs, the nucleus is present underlyingly; see Harris & Kaisse (1999) and discussion in chapter 3.

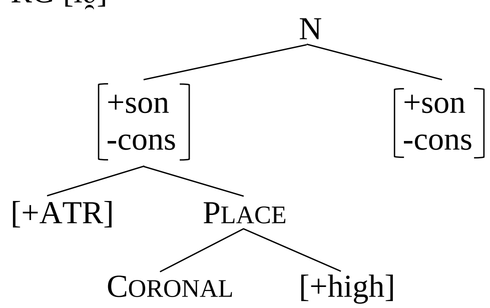
(25) Underlying Diphthongs

a. [aɪ̯]: b. [aʊ̯]: c. [ɔɪ̯]:



Diphthongs which come from underlying monophthongs (i.e. they are produced by Diphthongization) have this same structure: both vowels belong to one nucleus. See, for example, the diphthong derived from /i/, repeated in (26).

(26) RG [iə̯]



In sum, there are two different phonological structures of diphthongs in RG, as can be seen in the data in (27). Some diphthongs have the glide in the nucleus, as in (27a,d), while in diphthongs produced from Liquid Vocalization, the offglide is in the coda (see (27b,c)).

(27) Underlying and Derived Diphthongs

	Ramsau German	**Standard German**	**English**
a.	Underlying		
[aɪ̯]:	[haɪ̯]	*Hai*	‘shark’
[aʊ̯]:	[fʀaʊ̯]	*Frau*	‘woman’
[ɔɪ̯]:	[e.fɔɪ̯]	*Efoi*	‘ivy’
b.	Derived from Liquid Vocalization of /l/		
[uɪ̯]:	[ʃpuɪ̯n]	*spulen* (INF.)	‘to wind’
[ʊɪ̯]:	[vʊɪ̯n]	*Wille*	‘will’
[oɪ̯]:	[ɛɐ̯.tsoɪ̯n]	*erzählen* (INF.)	‘to narrate’
[ɔɪ̯]:	[fɔɪ̯]	*voll*	‘full’
[eɪ̯]:	[feɪ̯n]	*fehlen* (INF.)	‘to lack’
[ɛɪ̯]:	[ʃnɛɪ̯]	*schnell*	‘fast’

c.	Derived from Liquid Vocalization of /ʀ/[63]		
[iɐ̯]:	[pə.piɐ̯]	*Papier*	'paper'
[eɐ̯]:	[meɐ̯]	*Meer*	'sea'
[ɛɐ̯]:	[ʃtɛɐ̯n]	*Stern*	'star'
[aɐ]:	[kaɐ̯.pfm̩]	*Karpfen*	'carp'
[uɐ̯]:	[ʃtuɐ̯]	*stur*	'stubborn'
[ʊɐ̯]:	[vʊɐ̯m]	*Wurm*	'worm'
[ɔɐ̯]:	[tɔɐ̯]	*Tor*	'gate'

d.	Derived from Diphthongization		
[iə̯]:	[viə̯]	*wie*	'how'
[eə̯]:	[veə̯k]	*Weg*	'path'
[uʊ̯]:	[tsuʊ̯]	*zu*	'to'
[oʊ̯]:	[toʊ̯k]	*Tag*	'day'

It can be observed that (almost) any vowel surfaces before the coda glide in (27b,c). Conversely, in diphthongs with both glide and vowel occupying the nucleus, the type of vowel preceding the glide is highly restricted. For the underlying diphthongs in (27a), only [a] or [ɔ] can precede the glide; in the diphthongs derived via Diphthongization in (27d), only tense vowels can precede the glide.

The difference between the vocalic restrictions preceding the coda glide in (27a,d) but not in the nuclear glide in (27b,c) is predicted, given their syllabic constituency. As the vowel and glide in (27a,d) are in the same constituent, there is a closer relationship between the two [-consonantal] segments. Booij (1989:320) discusses syllabic representations for diphthongs, stating "We expect segments within the same nucleus to be subject to co-occurrence restrictions with respect to each other." Yip (2003:786) likewise notes that, "It is indeed true that many of the most convincing arguments for constituency come from phonotactics and co-occurrence restrictions. The central idea is that these will be stricter inside a constituent than between constituents." See also Steriade (1988) and Davis &

[63] I do not have data for the derived diphthongs [oɐ̯] or [ɪɐ̯]; I consider this an accidental gap.

Hammond (1995) for further discussion of constituency. Co-occurrence restrictions, which can be seen in the diphthongs in (27a,d), provide support for having two different syllabic representations for diphthongs in RG.[64]

5.3.2 Vowel Dissimilation

Another process which occurs in conjunction with Liquid Vocalization affects the vowel preceding a coda /l/. As shown in (28), if the stem vowel before /l/ is front, it becomes back after /l/ vocalizes, regardless of whether or not the stem vowel is high (in (28a)) or mid (in (28b)). The process whereby a front vowel becomes back accounts for Generalization (16c) and is referred to here as Vowel Dissimilation.

(28) Data for Vowel Dissimilation

	Ramsau German	Standard German	English
a.	High Vowels		
	[ʃpu̱ɪ̯n ~ ʃpi̱.lɐ]	*spielen ~ Spieler*	‘to play ~ player’
	[vʊ̱ɪ̯ ~ vɪ̱.lɪk]	*Wille ~ willig*	‘will ~ willing’
b.	Mid Vowels		
	[ɛɐ̯.tso̱ɪ̯n ~ ɛɐ̯.tse̱.lɐ]	*erzählen ~ Erzähler*	‘to narrate ~ narrator’
	[heɐ̯.ʃtɔ̱ɪ̯n ~ heɐ̯.ʃtɛ̱.lɐ]	*herstellen ~ Hersteller*	‘to make ~ maker’

[64] Following the predictions in the literature above concerning constituency, there should be fewer restrictions on a consonant which comes after an underlying diphthong or a diphthong derived via Diphthongization in RG because the diphthong and following consonant belong to separate constituents (i.e. the nucleus and coda). Conversely, there should be more restrictions on a consonant following a diphthong derived via Liquid Vocalization, as both the glide and consonant are in the same constituent (i.e. the coda). This type of behavior is confirmed in RG: for example, RG allows a sequence with an underlying diphthong followed by a liquid such as /taɪl/, but not an underlying /l/ followed by another /l/, as in */tall/. Thus, constituency also bears on which consonants can follow diphthongs in RG.

The second example of each pair in (28) shows the underlying vowel – the vowel which occurs when an [l] surfaces. For example, in the word *Spieler* in (28a), the underlying /l/ is realized as [l] because it is in the syllable onset; directly preceding this [l], we see that the underlying vowel /i/ surfaces as [i]. The first example in each pair illustrates that the underlying vowel is realized as back (and rounded) after Liquid Vocalization has applied. For example, in the verb *spielen*, the underlying /i/ is realized as [u] because it precedes the vocalized /l/, namely [ɪ̯]. The data in (28a) show that the high front vowels /i/ and /ɪ/ are realized as the high back rounded vowels [u] and [ʊ] when they precede a vocalized /l/. Similarly, when the mid front vowels /e/ and /ɛ/ precede a vocalized /l/, as in the data in (28b), they are realized as the mid back rounded vowels [o] and [ɔ].

The rule of Vowel Dissimilation produces a merger of a contrast in words, such that a SG minimal pair, like *spielen* and *spulen*, are produced as the same in RG. Examples of this are given in (29).

(29) Vowel Dissimilation produces loss of contrast

Ramsau German	**Standard German**	**English**
[ʃpuɪ̯n]	*spielen*; *spulen*	‘to play; to wind’
[mʊɪ̯ç]	*Milch*; *Mulch*	‘milk; mulch’

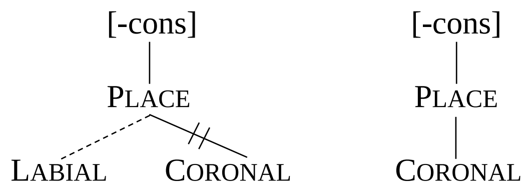
A linear rule for Vowel Dissimilation is given in (30) which states that an underlying front vowel /i/, /ɪ/, /e/, or /ɛ/ becomes [u], [ʊ], [o], or [ɔ] when it precedes a CORONAL non-syllabic vowel.

(30) Vowel Dissimilation

/i, ɪ, e, ɛ/ → [u, ʊ, o, ɔ] / ___ [ɪ̯]

Vowel Dissimilation is restated in terms of features in (31). This rule states that a CORONAL vowel becomes LABIAL if it precedes another CORONAL vowel. Specifically, CORONAL delinks from the first vowel, and LABIAL is added.

(31) Vowel Dissimilation with Features



Vowel Dissimilation is a dissimilation because it is triggered by an avoidance of two consecutive ROOT nodes with an identical feature. In this case, the feature which dissimilates is CORONAL: the CORONAL node becomes LABIAL in order to avoid two adjacent instances of the feature CORONAL.

Dissimilations are often assumed to be *irregular* and *diachronic* (Hock & Joseph 1996). The analysis and data presented here, however, show that RG has a *regular synchronic* rule of dissimilation. Hall (2009) also discusses another regular, synchronic dissimilation in a different Bavarian German dialect in Austria, and he cites discussion in Campbell (2004:30-32), which gives evidence of regular dissimilations in Greek, Sanskrit, and Bantu. Following Yip (1988), Cohn (1992), Alderete & Frisch (2007), and Hall (2008, 2009), I consider the Rule of Vowel Dissimilation to be a repair to a feature-specific OCP constraint (Goldsmith 1976) banning a dispreferred structure. OCP CORONAL, given in (32), states that two adjacent [-consonantal] ROOTS which are specified as CORONAL are ungrammatical.

(32) OCP CORONAL[65]

```
*[-cons]   [-cons]
    |          |
  PLACE      PLACE
    |          |
   COR        COR
```

OCP CORONAL is necessarily limited to sequences of CORONAL vowels ([-consonantal] segments) because there is no restriction on other sequences of CORONAL segments. As shown in the data in (33), other combinations of consecutive CORONAL segments are frequently allowed and surface. For example, CV sequences, as in the word *Tisch* [tɪʃ] in (33a), are completely acceptable in RG. Other allowed consecutive CORONAL segments are VC, as in *ist* [is] in (33b), and CC, as in *tanzt* [danst] in (33c).

(33) Legal Consecutive CORONAL segments

	Ramsau German	**Standard German**	**English**
a.	CV		
	[tɪʃ]	*Tisch*	‘table’
	[dɛŋk]	*gedacht* (PP.)	‘thought’
	[si]	*sie*	‘she’
b.	VC		
	[is]	*ist* (3.SG.)	‘is’
	[vin]	*Wien*	‘Vienna’
	[bi.tə]	*bitte*	‘please’
c.	CC		
	[danst]	*tanzt* (3.SG.)	‘dances’
	[gvist]	*gewusst* (PP.)	‘known’

[65] The data given above show that this constraint applies, perhaps exclusively, in the context of an /l/ which vocalizes. Although I do not have other RG data where this constraint is active, I leave open the possibility that it extends to contexts other than Liquid Vocalization of /l/.

A derivation for Liquid Vocalization and Vowel Dissimilation is given in (34). It can be observed that both rules apply in the first word *spielen*: here, Liquid Vocalization feeds Vowel Dissimilation because the former rule produces the context (adjacent coronal vowels) for the latter rule. In the third word, *voll*, Liquid Vocalization affects the /l/, and because the underlying vowel is already LABIAL, Vowel Dissimilation does not apply.

(34) Liquid Vocalization and Vowel Dissimilation
for *spielen*, *Spiele*, and *voll*

UR	/ʃpil-n/	/ʃpil-ə/	/fɔl/
LV	ʃpiɪ̯n	-----	fɔɪ̯
VD	ʃpuɪ̯n	-----	-----
PR	[ʃpuɪ̯n]	[ʃpi.lə]	[fɔɪ̯]

As shown in this section, Liquid Vocalization feeds Vowel Dissimilation and therefore creates a transparent output. However, Vowel Dissimilation is not exceptionless for front mid vowels, as the discussion in the following section reveals.

5.3.3 Variation in Application of Vowel Dissimilation

There are two ways in which Vowel Dissimilation shows variation for underlying front mid vowels preceding a vocalized /l/, and both types of variation can occur for a single speaker. The first type of variation concerns vowel height. Specifically, an underlying mid front /e/ or /ɛ/ in the context before a vocalized /l/ may be produced as either the high back vowels [u, ʊ] or the mid back vowels [o, ɔ]. Representative data can be seen in (35). In (35a), there is an alternation between [e, ɛ] and the high back vowels [u, ʊ] (from underlying /e, ɛ/), such as in the words *Erzähler* and *erzählen*. In (35b), the alternation of vowels does not involve height, but simply the dimension of PLACE: /e, ɛ/ are realized as either [e, ɛ] or as [o, ɔ], even within the same words *Erzähler* and *erzählen*, where the alternation is mid front and high back in (35a). Again, all of this variation can occur within one speaker.

(35) Data for Mid Vowel Variation

	Ramsau German	**Standard German**	**English**
a.	High Vowel Output		
	[ɛɐ̯.tsu̱ɪ̯n ~ ɛɐ̯.tse̱.lɐ]	*erzählen ~ Erzähler*	‘to narrate ~ narrator’
	[vu̱ɪ̯n ~ ve̱.lɐ]	*wählen ~ Wähler*	‘to vote ~ voter’
	[heɐ̯.ʃtʊ̱ɪ̯n ~ heɐ̯.ʃtɛ̱.lɐ]	*herstellen ~ Hersteller*	‘to make ~ maker’
b.	Mid Vowel Output		
	[ɛɐ̯.tso̱ɪ̯n ~ ɛɐ̯.tse̱.lɐ]	*erzählen ~ Erzähler*	‘to narrate ~ narrator’
	[mo.dɔ̱ɪ̯ ~ mo.dɛ̱.lə]	*Modell ~ Modelle*	‘model ~ models’
	[heɐ̯.ʃtɔ̱ɪ̯n ~ heɐ̯.ʃtɛ̱.lɐ]	*herstellen ~ Hersteller*	‘to make ~ maker

RG also has similar height variation involving back vowels before a vocalized /l/. Data are given in (36), where the stem vowel in the word *voll* is optionally produced as [ɔ] or [ʊ] before [ɪ̯].

(36) Height Variation for Back Mid Vowels

Ramsau German	**Standard German**	**English**
[fɔɪ̯ ~ fʊɪ̯]	*voll*	‘full’

The second type of variation involving underlying front mid vowels before a vocalized /l/ is the optionality of Vowel Dissimilation. Even for the same speaker, there are certain morphemes with a front vowel followed by vocalized /l/ in which the front vowel surfaces as [u] in one sentence, and in the next sentence, the same morpheme contains [e]. Data displaying this variation are given in (37).

(37) Data for Vowel Dissimilation Variation

	Ramsau German	**Standard German**	**English**
a.	Back Rounded Vowel		
	[fu̲ɪ̯n ~ fe̲.lɐ]	*fehlen ~ Fehler*	‘to lack ~ mistake’
	[su̲ɪ̯ ~ se̲.lɪk]	*Seele ~ selig*	‘soul ~ blessed’
	[ʃnʊ̲i̯]	*schnell*	‘fast’
b.	Front Unrounded Vowel		
	[fe̲ɪ̯n ~ fe̲.lɐ]	*fehlen ~ Fehler*	‘to lack ~ mistake’
	[se̲ɪ̯ ~ se̲.lik]	*Seele ~ selig*	‘soul ~ blessed’
	[ʃnɛ̲ɪ̯]	*schnell*	‘fast’

The data in (37a) illustrate the application of Vowel Dissimilation: an underlying front mid vowel which precedes a vocalized /l/ surfaces as a LABIAL vowel. For example, in the word *Fehler*, the underlying /e/ is present before a syllable-initial [l]; in the verb form *fehlen*, the stem vowel appears as the high back vowel [u] before vocalized /l/. The data in (37b) show examples of the same morphemes in (37a), but in (37b), a vowel preceding a vocalized /l/ does not become LABIAL. For example, the verb *fehlen* in (37b) has a vocalized /l/, but the underling stem vowel /e/ remains front; it does not undergo Vowel Dissimilation to become a LABIAL vowel.

This section has shown two types of variation which affect the front mid vowels [e] and [ɛ] when the following /l/ vocalizes to front [ɪ̯]. The stem vowel may optionally undergo Vowel Dissimilation and become a back vowel (as shown in (36)), and for those data which undergo Vowel Dissimilation, the resulting back vowel may be either mid [o, ɔ] or high [u, ʊ] (as shown in (35)). These facts are true only for RG mid front vowels, but not for RG high front vowels. When a high front vowel precedes an /l/ which vocalizes, Vowel Dissimilation always occurs, and the resulting stem vowel is always high. That is, there is never variation in application of Vowel Dissimilation or the height of the stem vowel when the underlying vowel is high and front /i/ or /ɪ/.

The optionality of Vowel Dissimilation for mid vowels appears to be attested in data given in the literature for other varieties of Bavarian German. Merkle (2005) lists the following data which hold for speakers in Bavaria:[66]

(38) L-Vocalization Data from Merkle (2005:23)

		SG	BG	IPA	English
a.	/i/	*viel*	*vui*	/i/ → [u]	'much'
b.	/ɪ/	*Bild*	*Buiddl*	/ɪ/ → [u]	'picture'
		silbern	*suiwàn*		'silver'
		April	*Abrui*		'April'
c.	/e/	*Seele*	*Säi*	/e/ → [ɛ]	'soul'
		stehlen	*schdäin*		'to steal'
d.	/ɛ/	*Welt*	*Wäid*	/ɛ/ → [ɛ]	'world'
		Geld	*Gäid*		'money'
		stellen	*schdäin*		'to place'

As the data in (38a,b) show, in other Bavarian German dialects high front vowels which precede a vocalized /l/ surface as a high back [u]. The <u> in these words suggests that Vowel Dissimilation also applies. The mid front vowels in (38c,d), however, apparently do not undergo Vowel Dissimilation, but rather both tense /e/ and lax /ɛ/ are neutralized to lax [ɛ] when they precede vocalized /l/.

[66] These data are presented with Merkle's (2005) symbols. IPA transcriptions in slanted and square brackets are my own.

The data in (39) summarize the difference in application of Vowel Dissimilation in the BG dialects spoken in Bavaria and Styria.[67] As can be seen with the word *spielen* in (39a), Vowel Dissimilation applies uniformly to high front vowels in both BG dialect regions. The data in (39b), however, show that application of Vowel Dissimilation to mid front vowels differs between the BG spoken in Styria (RG) and that spoken in Bavaria (DG). Namely, Vowel Dissimilation applies to front mid vowels in RG, thereby producing [uɪ̯], [ʊɪ̯], [oɪ̯], or [ɔɪ̯], but dissimilation does not apply to mid front vowels in DG.

(39) Vowel Dissimilation in BG

RG	**DG**	**SG**	**English**
a. High Vowels			
[ʃpu̲ɪ̯n]	[ʃpu̲ɪ̯n]	*spielen* (INF.)	‘to play’
b. Mid Vowels			
[vu̲ɪ̯n]	[ve̲ɪ̯n]	*wählen* (INF.)	‘to vote’
[fu̲ɪ̯n]	[fe̲ɪ̯n]	*fehlen* (INF.)	‘to lack’
[su̲ɪ̯]	[se̲ɪ̯]	*Seele*	‘soul’
[ʃnʊ̲ɪ̯]	[ʃnɛ̲ɪ̯]	*schnell*	‘fast’
[ɛɐ̯.tso̲ɪ̯n]	[ɛɐ̯.tse̲ɪ̯n]	*erzählen* (INF.)	‘to narrate’
[heɐ̯.ʃtɔ̲ɪ̯n]	[hɛɐ̯.ʃtɛ̲ɪ̯n]	*herstellen* (INF.)	‘to make’

While processes like Vowel Dissimilation occur in both varieties I investigated (as indicated in (39)), the distribution described in the descriptive grammars more closely matches the variety spoken in Bavaria than the one which is spoken in Styria. This fact, coupled with the variation in application of Vowel Dissimilation in RG described above, makes the RG data even more interesting. The variation indicates that Styrian speakers have generalized the rule to a natural class that is more inclusive: mid and high vowels.

[67] The data from Bavaria in (39) are taken from my own study of speakers in Dachau and accurately reflect the types of data given in BG grammars for Bavaria.

This broader context for Vowel Dissimilation (i.e. mid and high vowels, not simply high vowels) can help explain the height variation seen in the data in (35). As discussed above, speakers always dissimilate the place of high vowels which precede a vocalized /l/, and the resulting vowel is always a high back vowel. Now that speakers also (optionally) dissimilate the place of mid vowels which precede vocalized /l/, they may be unsure of which back vowel to dissimilate to – either the mid back vowels [o, ɔ], or high back vowels [u, ʊ], which are already the vowels used when high vowels dissimilate place. From a phonological standpoint, a mid front vowel which becomes back would most naturally result in the mid back vowel because only place would change, not height; however, the precedent for Vowel Dissimilation in BG is with high vowels. Thus, data such as [vuɪ̯n ~ ve.lɐ] *wählen ~ Wähler,* where the vowels [e] and [u] alternate within a morpheme, show a type of analogy to the regular output of [u] with high vowels which undergo Vowel Dissimilation.

5.3.4 Interaction of Liquid Vocalization and other processes

In contrast to certain processes discussed in chapter 4 involving nasals, Liquid Vocalization produces a transparent output when it interacts with other rules. Consider first the potential interaction between Liquid Vocalization and DFA. Data showing sequences of underlying liquids followed by the dorsal fricative /x/ are given in (40-41). In (40), the underlying sequence of /lx/ surfaces as [ɪ̯ç], where /l/ vocalizes in the coda, as discussed above.

(40) Sequence of /lx/

Ramsau German	Standard German	English
[mʊɪ̯ç]	*Milch*	‘milk’
[ɛɪ̯ç]	*Elch*	‘elk’
[vɔɪ̯ç]	*Walch*	‘goatgrass’
[mɔɪ̯ç]	*Molch*	‘salamander’

The data in (41) show that the underlying sequence /ʀx/ is realized with a vocalized /ʀ/ as [ɐ̯x]. Note that this is not what one would find in SG, where the /x/ following /ʀ/ undergoes DFA. Thus, a word such as *Storch* from (41) is produced as [ʃtɔɐ̯ç] in SG.

(41) Sequence of /ʀx/

Ramsau German	Standard German	English
[ʃtɔɐ̯x]	*Storch*	‘stork’
[lʊɐ̯x]	*Lurch*	‘amphibian’
[mo.naɐ̯x]	*Monarch*	‘monarch’
[kiɐ̯.xn̩]	*Kirche*	‘church’
[lɛɐ̯.xn̩]	*Lerche*	‘lark’

As was discussed in chapter 3, RG [x] and [ç] are in complementary distribution: [x] occurs after back vowels, and [ç] occurs after front vowels. The data above with vocalized liquids are therefore not surprising; on the surface, [x] occurs after the back glide [ɐ̯] derived from /ʀ/, while [ç] occurs after coronal [ɪ̯] derived from /l/. Features for /x/ and [ç], as well as [ɐ̯] (from /ʀ/) and [ɪ̯] (from /l/) are given in (42).

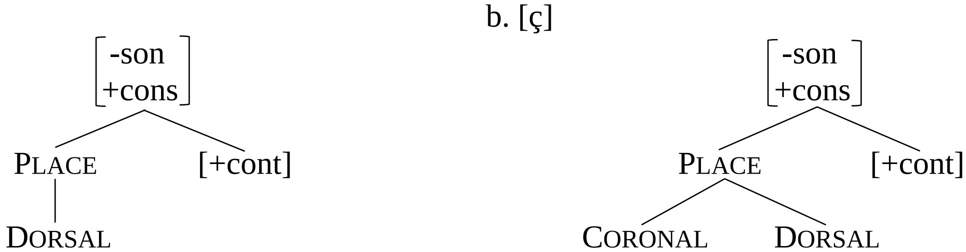
(42) Features of Dorsal Fricatives, [ʁ̯], and [ɹ̯]

	/x/	[ç]	[ʁ̯]	[ɹ̯]
[sonorant]	–	–	+	+
[consonantal]	+	+	–	–
[continuant]	+	+		
[nasal]			–	–
PLACE	✓	✓	✓	✓
CORONAL		✓		✓
DORSAL	✓	✓	✓	

It can be observed in (42) that both /x/ and [ʁ̯] are marked for the place feature DORSAL, while [ç] and [ɹ̯] share the place feature CORONAL. As discussed in chapter 3, [ç] also has a DORSAL node under PLACE, creating a complex structure. Feature representations for [x] and [ç] are repeated (43).

(43) Feature Representations of [x] and [ç]

a. [x] b. [ç]



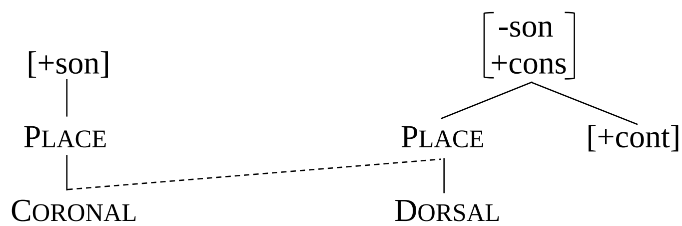
The rule of DFA in (44) states that an underlying DORSAL fricative /x/ is realized as corono-dorsal (i.e. palatal) when it follows a CORONAL sonorant.

(44) Dorsal Fricative Assimilation

a.

$$/x/ \rightarrow [ç] \;/\; \begin{bmatrix} +\text{sonorant} \\ \text{CORONAL} \end{bmatrix} \_\_\_$$

b.



Data such as [kiɐ̯.xŋ̩] *Kirche* from (41), where /x/ surfaces as [x] after a vocalized /ʀ/, provide an argument for /ʀ/ being specified for DORSAL: /x/ does not assimilate place and become [ç] because neither /ʀ/ nor its vocalized counterpart [ɐ̯] is CORONAL, and thus it does not meet the structural description of the rule in (44b).

I do not specify whether the target of DFA is a consonant ([+consonantal]) or vowel ([-consonantal]). Even though an /l/ preceding /x/ is almost always vocalized to [ɪ̯], there is one token where a speaker produces *Walch* as [valç] without vocalized /l/. In this rare instance when the speaker does not vocalize /l/, DFA applies, even though the segment preceding dorsal /x/ is a consonant.[68] Because I do not specify in (44b) that the target of DFA has to be [-cons], the trigger can either be a CORONAL vowel or a CORONAL sonorant consonant.

My analysis of DFA differs from the one proposed by Robinson (2001), which predicts that there should be a palatal after front vowels and /n l ʀ/. Robinson (2001:84-85) argues that on phonetic grounds, /n l ʀ/ pattern similarly in the context of before [ç];

[68] Impressionistically I believe that /x/ would become [ç] when the CORONAL consonant /n/ precedes, but I do not have data supporting this. That is, I hypothesize that RG speakers would produce a word like *Mönch* ‘monk’ as [mɛnç], where velar /x/ assimilates place of the preceding CORONAL /n/ and surfaces as [ç].

specifically, the palatal fricative has a similar spectral energy-concentration for fricatives when it follows /n l ʀ/. Glover's (2014) analysis makes the same prediction for SG: under his analysis, /ʀ/ is treated phonologically as a complex corono-dorsal sound which receives both [CORONAL] and [DORSAL] by default rules. Thus, he captures the natural class of triggers of DFA as [+sonorant, CORONAL]. In RG, however, /ʀ/ does not trigger DFA. My analysis, where /ʀ/ and its vocalized counterpart [ɐ̯] are both DORSAL, thus predicts that the sequence of /ʀx/ should surface as [ɐx], which is exactly what the phonetic data show.

In (45), I show that DFA and Liquid Vocalization do not interact. Similar to Glover's (2014:76) analysis, the ordering of DFA and Vocalization in RG does not matter because the feature which changes in a vocalization is [consonantal], not PLACE. Thus, either the rule ordering in (45a) or (45b) will produce the correct output.

(45) Derivation of DFA and Liquid Vocalization with *Molch* and *Kirche*[69]

a.	No Rule Interaction		b.	No Rule Interaction	
UR	/mɔlx/	/kiʀxn/	**UR**	/mɔlx/	/kiʀxn/
DFA	mɔlç	-----	**LV**	mɔɪ̯x	kiɐ̯xn
LV	mɔɪ̯ç	kiɐ̯xn	**DFA**	mɔɪ̯ç	-----
PR	[mɔɪ̯ç]	[kiɐ̯xŋ̍]	**PR**	[mɔɪ̯ç]	[kiɐ̯.xŋ̍]

While Liquid Vocalization does not interact with DFA, it does interact with Progressive Nasal Place Assimilation (PNPA). Data for this can be seen in (46).

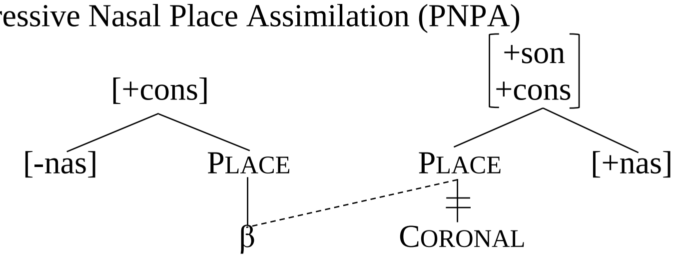
[69] Data for *Kirche* also show Progressive Nasal Place Assimilation, which was discussed in chapter 4. For the sake of simplicity, I have not included this rule in the derivation, and its effects are only seen in the phonetic representation.

(46) Verbal Infinitives: Stem-final Liquid

	Ramsau German	**Standard German**	**English**
a.	Underlying /ʀ/		
	[fə.liɐ̯n]	*verlieren* (INF.)	'to lose'
	[leɐ̯n]	*lehren* (INF.)	'to teach'
	[tuɐ̯n]	*touren* (INF.)	'to tour'
	[boɐ̯n]	*bohren* (INF.)	'to drill'
	[ʃpɔɐ̯n]	*sparen* (INF.)	'to save'
	[ʀuʊ̯.dɐn]	*rudern* (INF.)	'to row'
b.	Underlying /l/		
	[ʃpuɪ̯n]	*spielen* (INF.)	'to play'
	[ɛɐ̯.tsoɪ̯n]	*erzählen* (INF.)	'to narrate'

The data in (46) show vocalized /ʀ/ and /l/ surfacing before the infinitive marker [-n], which is representative of any coronal nasal. Recall the rule of Progressive Nasal Place Assimilation (PNPA) from chapter 4, repeated in (47).

(47) Progressive Nasal Place Assimilation (PNPA)



PNPA shows that the coronal nasal /n/ receives place specification from a preceding consonant, and the CORONAL node under PLACE deletes. A derivation showing that Liquid Vocalization applies first and bleeds PNPA is given in (48a); this is a transparent interaction.

(48) Derivation for Liquid Vocalization and PNPA with *lehren* and *spielen*

a.	Bleeding		b.	Counterbleeding (Overapplication)	
UR	/leʀ-n/	/ʃpil-n/	**UR**	/leʀ-n/	/ʃpil-n/
LV[70]	leɐ̯n	ʃpuɪ̯n	**PNPA**	leʀŋ	ʃpiln
PNPA	------	-----	**LV**	leɐ̯ŋ	ʃpuɪ̯n
PR	[leɐ̯n]	[ʃpuɪ̯n]	**PR**	*[leɐ̯ŋ]	[ʃpuɪ̯n]

The incorrect rule ordering in (48b) displays a counterbleeding order with overapplication in *lehren*. If (48b) were correct, we would expect to see dorsal [ŋ] following a vocalized /ʀ/.

5.4 Additional Processes Affecting Liquids

5.4.1 Syllabic Liquids and Coda Clusters

RG sonorant consonants (liquids and nasals) occur frequently in coda clusters. See, for example, the data in (49).[71]

(49) Possible Word-Final Consonant Clusters

	Underlying	**Ramsau German**	**Standard German**	**English**
a.	/ʀ/-consonant			
	/-ʀt/	[ɔɐ̯t]	*Ort*	‘place’
	/-ʀm/	[ɔɐ̯m]	*Arm*	‘arm’

[70] For the sake of simplicity, I give the output of Liquid Vocalization along with Vowel Dissimilation here. As discussed above, these are two separate rules, which are in a feeding relationship.

[71] While I do not give an entire list of all possible combinations of coda clusters, a word such as (49c), for example, is representative of the combination of nasal plus obstruent. There is no implication that every obstruent can occur after every nasal.

b.	/l/-consonant			
	/-ld/	[bʊɪ̯t]	*Bild*	‘picture’
	/-lm/	[fʊɪ̯m]	*Film*	‘film’
c.	/n/-obstruent			
	/-nd/	[kɪnt]	*Kind*	‘child’

Each example in (49) conforms to the SSP in (50) and the sonority hierarchy in (51); i.e. each example shows a fall in sonority from the nucleus to the coda.

(50) **Sonority Sequencing Principle**: A syllable rises in sonority from the onset to the highest point, the nucleus, and falls in sonority to the coda.

(51) General Sonority Hierarchy (Clements 1990)

vowels > glides > liquids > nasals > obstruents

Considering these data, a more exact generalization can be made concerning codas:

(52) **Coda Generalization**: Coda clusters must fall in sonority.

This generalization is essentially a subset of the SSP, tailored specifically to codas. In contrast to the data in (49), when a final consonant cluster rises in sonority, that final consonant will not be able to be parsed as a coda without violating the Coda Generalization (i.e. the SSP). See, for example, the data in (53):[72]

[72] As with the data in (49), the words in (53) are representative of these types of combinations; this is not an exhaustive list.

(53) Impossible Word-Final Consonant Clusters

	Underlying	Ramsau German	Standard German	English
a.	consonant-/ʀ/			
	/-dʀ/	[bʀu.dɐ]	*Bruder*	‘brother’
	/-mʀ/	[tsɪ.mɐ]	*Zimmer*	‘room’
	/-lʀ/	[ʃpi.lɐ]	*Spieler*	‘player’
b.	consonant-/l/			
	/-tl/	[ti.tl̩]	*Titel*	‘title’
	/-ŋl/	[ɛ.ŋl̩]	*Engel*	‘angel’
	/-ʀl/	[kɔ.ɾl̩][73]	*Karl*	‘Charles’
c.	obstruent-/n/			
	/-tn/	[ʀo.tn̩]	*raten* (INF.)	‘to guess’

Each cluster in (53) either rises in sonority (e.g. /-dʀ/ in (53a)) or exhibits a sonority plateau (e.g. /-lʀ/ in (53a)); thus, these clusters would violate the Coda Generalization if they were parsed as coda clusters. When a final coda cluster does not exhibit a sonority fall, then the second consonant is syllabic. Syllabification is repeated in (54).

(54) Syllabification

a. Parse [-consonantal] segments in the nucleus.

b. Create onsets.

c. Create codas.

Final sonorants that are unable to be syllabified without violating the SSP are syllabified via Sonorant Syllabification in (55).

[73] The flap allophone of /ʀ/, which surfaces before syllabic /l/, will be discussed in the following section.

(55) **Sonorant Syllabification:** When a sonorant cannot be parsed into a preceding syllable, it is assigned a nucleus.

After (55) applies, consonants preceding a syllabic sonorant are re-syllabified as an onset to that syllable. Sonorant Syllabification can be seen in (53b,c) for /l/ and /n/. However, there is an additional change when /ʀ/ is made syllabic: syllabic /ʀ/ is realized as the vowel [ɐ]. The rule in (56a) accounts for that change. It states that an /ʀ/ which is in the syllable nucleus (N) is realized as [ɐ]. Syllabic R-Vocalization is also given with features in (56b).

(56) Syllabic R-Vocalization

a. $/\text{ʀ}/ \rightarrow [\text{ɐ}] \;/\; \overset{\text{N}}{\underline{\qquad}}$

b. $\begin{bmatrix} \text{+son} \\ \text{+cons} \\ \textsc{Dors} \\ \text{-nas} \end{bmatrix} \rightarrow [\text{-cons}] \;/\; \overset{\text{N}}{\underline{\qquad}}$

Syllabic R-Vocalization is different from Liquid Vocalization in terms of the environment of the rule; Liquid Vocalization occurs in the syllable coda (i.e. after the stem vowel), while Syllabic R-Vocalization occurs when /ʀ/ is in the syllable nucleus. Thus, the outputs of these two rules are different: Liquid Vocalization produces a glide (in the coda), while Syllabic R-Vocalization produces a vowel (in the nucleus).

A derivation illustrating the syllabification of word-final sonorant consonants is given in (57). I do not divide Syllabification into the three steps; I simply give one output where all three steps have applied.

(57) Syllabification of Sonorants[74]

	a. 'to wind'	b. 'title'	c. 'player'
UR	/ʃpuln/	/titl/	/ʃpilʀ/
Syll.	σ O N C ʃ p u l n	σ O N C t i t l	σ O N C ʃ p i l ʀ
SS	-----	σ σ O N O N t i t l	σ σ O N O N ʃ p i l ʀ
SRV	-----	-----	ʃpi.lɐ
LV	ʃpuɪ̯n	-----	-----
PR	[ʃpuɪ̯n]	[ti.tl̩]	[ʃpi.lɐ]

(57a) contains a coda cluster falling in sonority; thus it follows the Coda Generalization. (57b) contains a cluster with rising sonority, while (57c) shows a coda sonority plateau. Since the final sonorants in (57b,c) would violate the Coda Generalization if both consonants were parsed in the coda, the second word-final sonorant cannot be parsed by Syllabification. These sonorants consequently undergo Sonorant Syllabification, and the preceding consonants are re-syllabified into the onset. (57c) shows that *Spieler* also undergoes Syllabic R-Vocalization, and (57a) displays Liquid Vocalization in *spulen*.

Another instance when a syllabic lateral surfaces is the BG diminutive, which is the suffix [l̩], e.g. *Häusl* for *Haus* (Merkle 2005:106-109).[75] In contrast to all other syllabic

[74] The following abbreviations are used for the rules: Syll = Syllabification, SS = Sonorant Syllabification, SRV = Syllabic R-Vocalization, LV = Liquid Vocalization.
[75] The realization of the diminutive suffix as [l̩] is the BG reflex of SG *-lein* (e.g. *Häuslein*). In contrast to SG, BG has no diminutive suffix *-chen* (e.g. *Häuschen*).

sonorant consonants, which are derived by Sonorant Syllabification, the diminutive morpheme /l̩/ is underlyingly syllabic. Representative examples are given in (58).

(58) Diminutive Syllabic-L[76]

	Ramsau German	**Standard German**	**English**
a.	Stem-final Obstruents		
	[gʀop ~ gʀa.bl̩]	*Grab ~ Gräbl*	'grave ~ little grave'
	[aŋ.gɛ.bot ~ aŋ.gɛ.bo.tl̩]	*Angebot ~ Angebotl*	'offer ~ little offer'
	[tok ~ ta.gl̩]	*Tag ~ Tägl*	'day ~ little day'
	[gʀof ~ gʀa.fl̩]	*Graf ~ Gräfl*	'count ~ little count'
	[tɪʃ ~ tɪ.ʃl̩]	*Tisch ~ Tischl*	'table ~ little table'
	[ʀeç ~ ʀe.çl̩]	*Reh ~ Rehl*	'deer ~ little deer'
b.	Stem-final Nasal		
	[tsaʊ̯n ~ tsaɪ̯.nl̩]	*Zaun ~ Zäunl*	'fence ~ little fence'
	[ʀɪŋ ~ ʀɪ.ŋl̩]	*Ring ~ Ringl*	'ring ~ little ring'
c.	Stem-final Vowel		
	[fʀaʊ̯ ~ fʀaʊ̯.l̩]	*Frau ~ Fraul*	'woman ~ little woman'
	[ʃtʀo ~ ʃtʀo.l̩]	*Stroh ~ Strohl*	'straw ~ little straw'

The data in (58a,b) show that the RG diminutive /l̩/ occurs after obstruents and nasals. When /l̩/ is added to a stem, the morpheme-final consonant is re-syllabified as the onset of the following syllable. For example, in the word pair *Tisch* ~ *Tischl*, the stem-final [ʃ] of *Tisch* is syllabified as the onset of the second syllable in *Tischl* [tɪ.ʃl̩]. In the data in (58c), /l̩/ attaches to a mono-syllabic stem ending in a vowel; the output is di-syllabic, where the second syllable is [l̩]. These data show that the syllabicity of the diminutive syllabic /l̩/ cannot be predicted because an underlying representation like /ʃtʀo-l/ with a nonsyllabic /l/

[76] No forms are present in my corpus with a stem-final labial nasal [m]. This is an accidental gap.

is a phonotactically legal word; cf. a word like *hohl* /hol/, which is realized with vocalized /l/ as [hoɪ̯].[77, 78]

5.4.2 Flapping

In any investigation of liquids in RG, it is necessary to consider how those sounds surface when adjacent to one another. In SG, a word like *Kerl* /kɛʀl/ 'guy' is parsed [.kɛʀl.] because the /ʀ/ and the /l/ form a legal coda cluster. The /ʀ/ then optionally undergoes R-Vocalization, and the word surfaces as [kɛɐ̯l] (or as [.kɛʀl.]). Sequences of RG /ʀl/, however, are different, as they surface with a flap allophone of /ʀ/. For example, the word *Kerl* is produced as [kɛ.ɾl̩] in RG.

Before discussing the phonological patterning of the flap allophone, I present phonetic evidence that the sound I transcribe as a flap truly is a flap. Phonetically, the flap is distinct from both the voiceless and voiced coronal stops in several ways. Reetz and Jongman (2009:40-41) describe the following characteristics of voiced and voiceless stops in comparison to flaps. First, stops are characterized by a stop portion followed by a burst, while flaps have a voiced closure duration and no burst. Second, the duration of stops and flaps differs. Specifically, voiceless stops are longer than voiced stops, and voiced stops,

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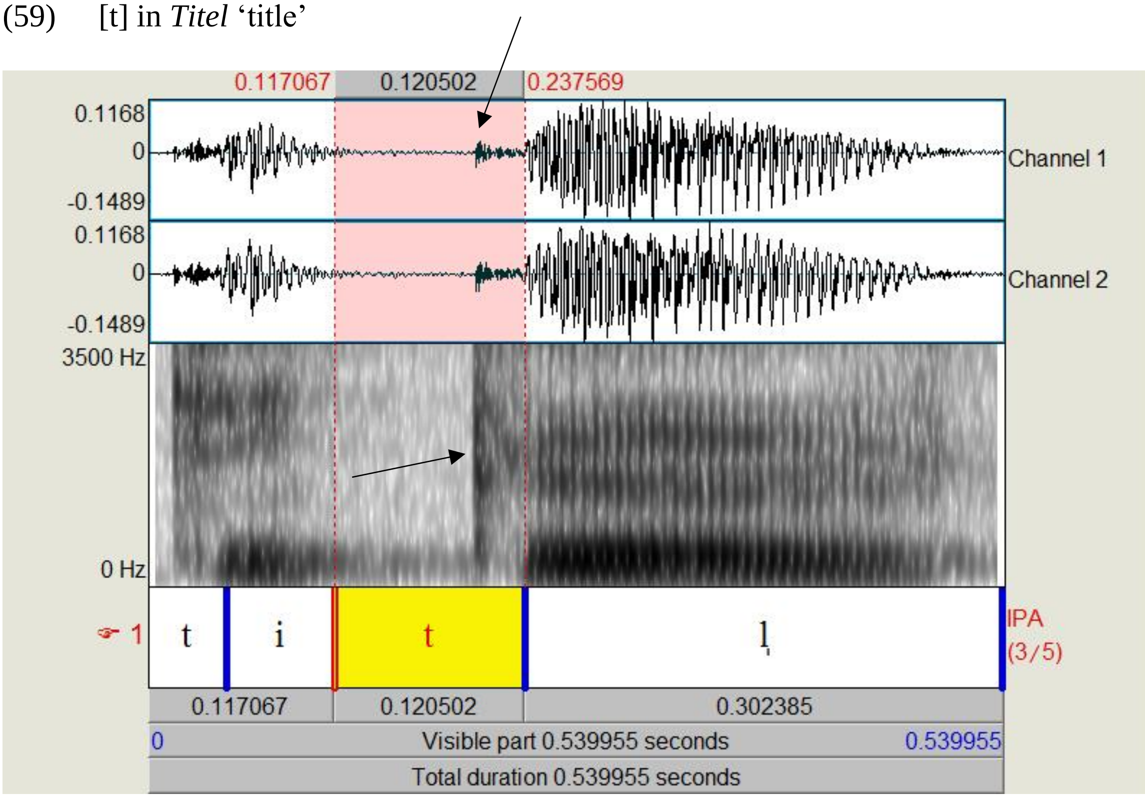
[77] In this way, the diminutive morpheme is different from other sonorant consonant morphemes, such as the infinitive marker /-n/ in *raten* (53c) or nominalizing /-ʀ/ in *Spieler* (53a). These morphemes are syllabic in words like *raten* and *Spieler* because they occur after a consonant (and thus undergo Sonorant Syllabification). However, after a vowel, /-n/ is not syllabic, for example in *spielen* [ʃpuɪ̯n].

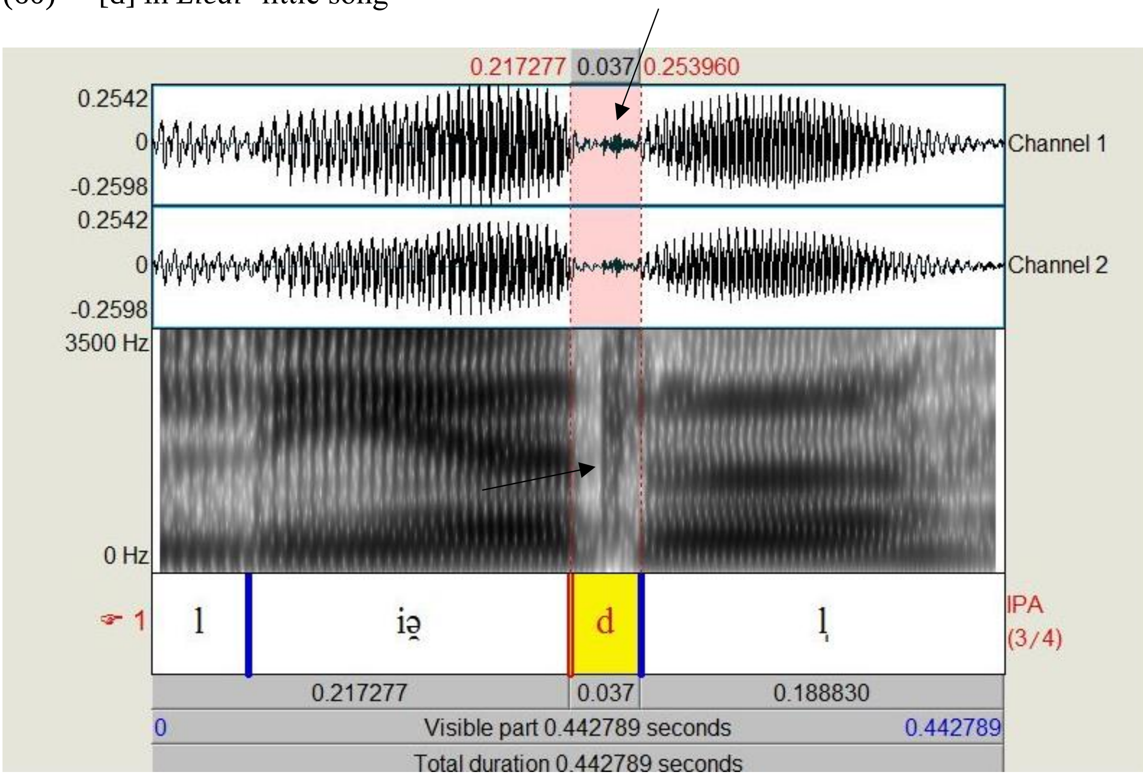
[78] The diminutive suffix /l̩/ is blocked from occurring after a stem ending in /l/; for nouns ending in /l/ (e.g. *Teil* 'piece'), RG speakers avoid adding the syllabic /l/ in several ways. For example, some speakers use the SG diminutive *-chen* in an effort to avoid adjacent [ll̩]. One speaker produced the diminutive of *Teil* 'piece' as *Teilchen*, using the SG diminutive form. Another speaker produced this diminutive as *Stückl*, where the RG diminutive *-l* was used, but with a different morpheme of similar meaning which did not end in /-l/. A similar generalization concerning the non-occurrence of a suffix beginning with /l/ after a stem ending in /l/ is true for SG, where a word like **Teillein* is ungrammatical (see Plank 1981:156-158 and Raffelsiefen 2004:165 for discussion).

in turn, are longer than flaps. Data showing these characteristics of RG voiceless and voiced coronal stops and the alveolar flap are given in (59-61). In (59), bursts can be seen in both the waveform and spectrogram (shown with arrows) of the voiceless coronal stop [t]. The same holds for the voiced coronal stop [d] in (60). The flap, however, has no burst in either the waveform or spectrogram (see (61)). The duration of each consonant also differs, according to the discussion above. Namely, the voiceless stop has the longest duration at 0.12 seconds; the voiced stop is shorter, measuring .037 seconds; and the flap is shortest, with a duration of .02 seconds.

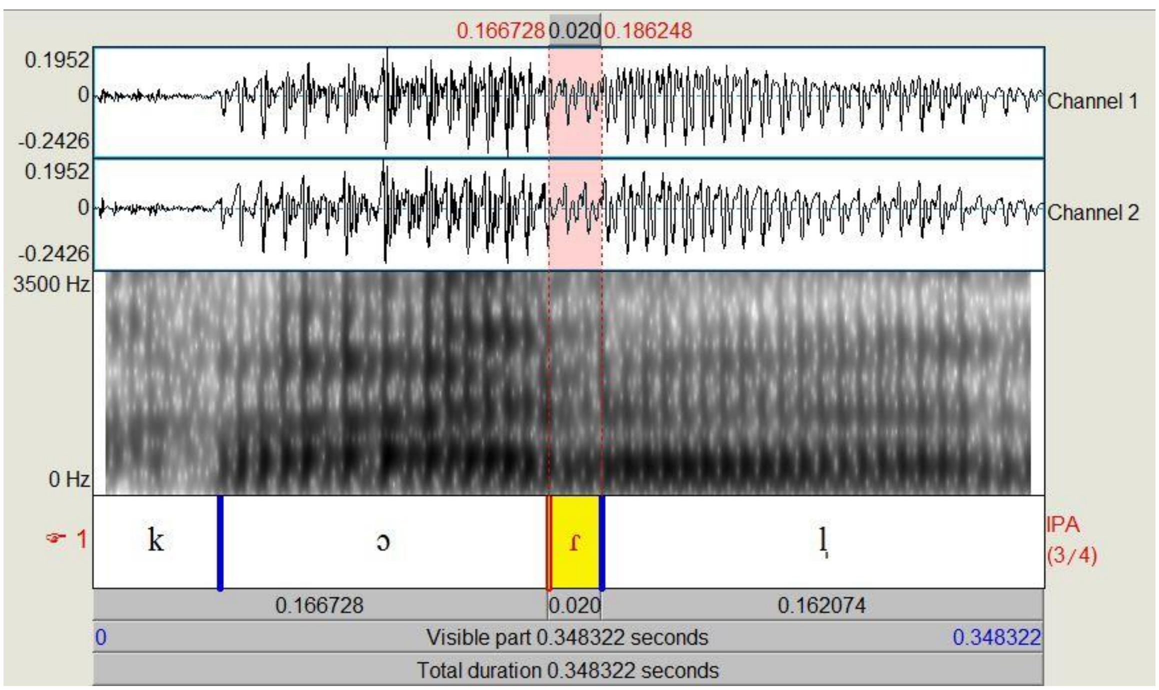
(59) [t] in *Titel* 'title'



(60) [d] in *Liedl* 'little song'



(61) [ɾ] in *Karl* 'Charles'



The spectrograms also give information pertaining to the voicing of each consonant. In (59) and (60), there is a clear break in the sound during the stop closure. The area around the F1 (known as the voice bar) in both [t] and [d] shows little to no energy; this means that voicing is either absent or very low in frequency. This is normal for stops, i.e. obstruents (see discussion in Reetz & Jongman 2009:193 and Johnson 2012:175). For the flap in (61), however, there is little change in the F1 area between the vowel, the flap, and the lateral, all of which, I argue, are sonorant segments. I do not have phonetic evidence that the flap is coronal, but I, as well as native speakers, perceive the flap as being coronal (alveolar).[79]

Data with the RG flap in words ending in /ʀl/ are given in (62).

(62) Word-final /-ʀl/

Ramsau German	**Standard German**	**English**
[kɔ.ɾl̩]	*Karl*	'Charles'
[kɛ.ɾl̩]	*Kerl*	'guy'
[kvɪ.ɾl̩]	*Quirl*	'beater'
[ʃmaŋ.kə.ɾl̩]	*Schmankerl*	'delicacy'
[ka.ʃpə.ɾl̩]	*Kasperl*	'clown'
[sa.kə.ɾl̩]	*Sackerl*	'bag'
[tsveɐ̯.gə.ɾl̩]	*Zwergerl*	'munchkin'

It can be observed that when /ʀl/ is word-final, a flap allophone of /ʀ/ surfaces as the onset of a syllable with [l̩] as the nucleus. The data in (63) show that this occurs word-internally in the first part of a compound; /ʀl/ is realized as [ɾl̩].

[79] The flap produced by my RG speakers sounds like the alveolar flap allophone of /t/ in American English, spoken in a word such as 'butter' [bʌɾɚ].

(63) Word-internal [ɾl̩]

Ramsau German	Standard German	English
[pɛ.ɾl̩.mʊt]	*Perlmutt*	'mother of pearl'
[vɪ.ɾl̩.pul]	*Whirlpool*	'whirlpool'
[fɔ.ɾl̩.bɛɐ̯k]	*Vorarlberg*	'Vorarlberg'
[ɛ.ɾl̩.kɪ.nɪk]	*Erlkönig*	'erl king'
[ta.fə.ɾl̩.klas.lɐ]	*Taferlklassler*	'first grader'
[ʃtɛ.kə.ɾl̩.fɪʃ]	*Steckerlfisch*	'fish on a stick'

I consider /ʀ/ to be the underlying representation and not the flap because the latter sound has a restricted (and hence predictable) distribution. [ɾ] occurs in an onset before syllabic [l̩], while [ʀ] occurs in all other onset positions (i.e. elsewhere in onsets): word-initially, as in [ʀot] 'red'; word-internally, as in [le.ʀɐ] 'teacher', and in a consonant cluster, as in [bʀu.dɐ] 'brother. Data with alternations, such as those in (64), provide further evidence that the flap is an allophone of /ʀ/. The data in (64) show that the realization of /ʀl/ with a flap also occurs when /l̩/ is underlyingly syllabic, i.e. when the diminutive syllabic /l̩/ attaches to a word ending in /ʀ/. In these examples, the glide [ɐ̯] (via Liquid Vocalization) alternates with the flap [ɾ].

(64) Diminutive with Stem-Final /-ʀ/

Ramsau German	Standard German	English
[aʊ̯.toɐ̯ ~ aʊ̯.tɔ.ɾl̩]	*Autor ~ Autorl*	'author ~ little author'
[poɐ̯ ~ pa.ɾl̩]	*Paar ~ Pärl*	'pair ~ little pair'

When /ʀ/ occurs before a non-syllabic /l/, /ʀ/ undergoes Liquid Vocalization. For example, in words like *fehlerlos* ‘flawless’ and *natürlich* ‘naturally’, /ʀ/ is syllabified in the coda, while the /l/ of *-los* and *-lich* is syllabified in the onset.[80]

Kranzmayer (1956:124) describes data like those in (62) as being instances where *rl* is realized as *dl*, so the trilled *r* is realized more as a voiced obstruent,[81] though he does not give IPA transcriptions (including syllabifications) for how this would be pronounced. It is clear that Kranzmayer is describing the process occurring in the data I give in (62-64), and it is not surprising that he describes the *r* in terms of a stop [d] because that was the closest phonetic symbol available at the time which matches certain characteristics of the flap [ɾ], in that it is voiced and perhaps [-continuant]. However, as I show earlier in this section, RG [d] and [ɾ] are very different phonetically.[82]

In contrast to /ʀl/, /l/ in /lʀ/ is not realized as a flap. Data showing sequences of /lʀ/ are presented in (65). It can be observed that /ʀ/ surfaces as the vowel [ɐ], which is the nucleus of a syllable with initial [l].

[80] I do not have these particular examples in my corpus, but I expect these sequences would behave in this way, considering the phonological patterning of the dialect discussed above. In the word *erstaunlich* ‘astonishing’, the suffix *-lich* is parsed as described here: [eɐ̯.ʃtaʊ̯n.lɪç].

[81] “Im Mittelbair. mit dem Burgenland, der Steiermark und Unterkärnten ist die Lautfolge *-rl*, soweit einstmals Zungen-*r* galt, zu *-dl* (so noch jetzt im Lavanttal, im obersteir. Obermurgebiet und in der Weststeiermark) und weiter zu mittelbair. Postdentalem -^{d}*l* geworden; z.B. in *khę̄*^{d}*l* (Kerl), *khǭ*^{d}*l* (Karl)…” (Kranzmayer 1956:124)

[82] The interested reader is referred to Hall (2009) for an analysis of data from another Bavarian German dialect described in Schatz (1897), where /r/ is recorded as [d] before /l/. Hall (2009) analyzes these data as a liquid dissimilation; however, if the dialect described in Schatz (1897) actually has a flap (and not [d]), another analysis would be needed to account for these data, as the flap is a liquid.

(65) Word-final /-lʀ/

	Ramsau German	**Standard German**	**English**
a.	[ʃpi.lɐ]	*Spieler*	‘player’
	[ve.lɐ]	*Wähler*	‘voter’
b.	[fɔ.lɐ]	*voller* (COMP.)	‘fuller’
c.	[ʃvu.lɐ]	*schwuler* (MASC, NOM)	‘gay’
	[ʃtaɪ̯.lɐ]	*steiler* (MASC, NOM)	‘steep’

A rule which accounts for the flap allophone is given in (66).

(66) Flapping

$$\begin{bmatrix} \text{+son} \\ \text{+cons} \\ \text{-nas} \\ \textsc{Dors} \end{bmatrix} \rightarrow \quad [\text{ɾ}] \quad / \quad \_\_\ [\text{l̩}]$$

Flapping states that a dorsal sonorant non-nasal consonant (i.e. /ʀ/) is realized as the flap [ɾ] before a syllabic [l̩]. At the end of this section, I suggest potential features for the flap. (67) incorporates Flapping in a derivation for sequences of underlying sonority plateaux with liquids.

(67) Derivation for /lʀ/ and /ʀl/[83]

	a.‘player’	b.‘guy’
UR	/ʃpilʀ/	/kɛʀl/
Syll.	σ O N C ʃ p i l ʀ	σ O N C k ɛ ʀ l
SS	σ σ O N O N ʃ p i l ʀ	σ σ O N O N k ɛ ʀ l
SRV	ʃpi.lɐ	-----
FL	-----	kɛ.ɾl̩
PR	[ʃpi.lɐ]	[kɛ.ɾl̩]

In the first step, Syllabification cannot apply to /ʀ/ in (67a) or /l/ in (67b) because RG does not allow for coda clusters to create a sonority plateau (cf. the Coda Generalization above). Therefore, Sonorant Syllabification applies to both words. Syllabic /ʀ/ vocalizes in (67a), and /ʀ/ undergoes Flapping in (67b) before a syllabic [l̩].

Words ending in /ʀl/ show that while Liquid Vocalizations are very prevalent in RG, /ʀ/ does not vocalize before a syllabic [l̩]. Instead, the sonority plateau /ʀl/ surfaces with the realization of the flap allophone of /ʀ/ in the syllable [ɾl̩].

There are several questions raised by Flapping. The most important question is why a flap allophone surfaces at all. Once Sonorant Syllabification occurs, the syllable [ʀl̩] no longer violates the Coda Generalization because [ʀ] is in the onset and [l̩] is the nucleus.

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83 Abbreviations are as follows: Syll = Syllabification, SS = Sonorant Syllabification, SRV = Syllabic R-Vocalization, FL = Flapping.

However, this syllable still violates the SSP because it does not rise in sonority to the nucleus, as liquids are equally sonorous. I hypothesize that the change of /ʀ/ to the flap is a repair to an onset-nucleus sonority plateau.

A solution along these lines requires that flaps be analyzed as less sonorous than /l/ in the sonority hierarchy in (51). Based on phonetic data in Romance languages (specifically Spanish), Parker (2002, 2008, 2011:1177) argues that flaps are cross-linguistically more sonorous than trills. The analysis of RG liquids, however, suggests that the opposite is true in this dialect: trills are more sonorous than flaps. The cross-linguistic ramifications of the present treatment of flaps and their place in the sonority hierarchy are topics I leave open for further research.

The analysis described above derives support from the repair of a sonority plateau consisting of adjacent nasals, which was discussed in chapter 4 (cf. discussion of Schwa Epenthesis). See, for example, *schwimmen* 'to swim', which does not surface with a syllabic [n̩] as *[ʃvɪ.mn̩]; rather, this word is produced [ʃvɪ.mə], where schwa epenthesizes between the underlying nasals.[84] Examples like those together with Flapping suggests that there is more than one repair in RG for sequences of underlying consonants in final position that are equally sonorous.

In the literature cited above regarding constituency (e.g. Steriade 1988 and others), the claim is made that if there is a sonority-based restriction on two adjacent sounds, then they belong to the same constituent. This would appear to pose a problem for the claim that onset-nucleus sonority plateaux are repaired in RG. However, a cross-linguistic preference for a sonority increase between an onset and nucleus is well attested; see, for example

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[84] Recall also that the final nasal subsequently deletes via Nasal Consonant Deletion.

Vennemann's (1988) Head Law. See also discussion in de Lacy (2001), Smith (2003), Gnanadesikan (2004), Prince & Smolensky (2004), and Zec (2007:188). Based on these data, I posit the following generalization: in RG, syllables rise in sonority from the onset to nucleus. According to this generalization, the flap, which is an onset to a syllabic [l̩], must be less sonorous than the uvular trill [ʀ] on some sonority hierarchy.

An additional question with respect to Flapping concerns the features which change. The flap is presumably [+consonantal] and [+sonorant], but it is not clear what features are changing. One possibility is that the segment produced by Flapping is [-continuant]. However, as discussed in chapter 3, sonorant consonants (including liquids) are not marked for the feature [continuant]; PLACE distinguishes between the liquids /ʀ/ and /l/. If /ʀ/ were marked as [+continuant] in the feature system, then Flapping may turn /ʀ/ into a [-continuant] sound. Recall that distinctive features only apply to underlying segments and should not depend on allophonic processes, according to the Contrastivist Hypothesis (Dresher 2009; see chapter 1). Perhaps this is one of the instances where the Contrastivist Hypothesis is too strong (Dresher 2009:206-209). That is, specification for the feature [continuant] is needed for an allophonic process, even though it is not distinctive for underlying liquids.

Flapping also changes a place feature because the underlying DORSAL /ʀ/ is realized as CORONAL /ɾ/. If it is true that Flapping is a repair to avoid a rise in sonority of an onset plus nucleus sequence then it is not clear why a place feature is changing (in addition to a manner feature, such as [continuant]).

5.4.3 Post-vocalic L-Vocalization

The data in (68) illustrate examples showing a different context for Liquid Vocalization of /l/. The first word in each pair of (68) shows the regular distribution of /l/, where [l] is consonantal in the syllable onset. The second word in each pair shows an optional pronunciation for the same word with the vocalized /l/ between vowels. For example, the word *Spieler* in (68a) has the onset /l/ in [ʃpi.lɐ], but *the same word* is also realized as [ʃpu.jɐ]. In the latter word, /l/ vocalizes between a vowel and vocalized /ʀ/ and is produced as the onset glide [j]. The nouns, comparative adjectives, and masculine strong adjectives which exemplify what I refer to below as the Post-vocalic L-Vocalization in (68) all end in –*er*.

(68)	Post-vocalic L-Vocalization		
	Ramsau German	**Standard German**	**English**
a.	Nouns		
	[ʃpi.lɐ ~ ʃpu.jɐ]	*Spieler*	‘player’
	[ʀo.lɐ ~ ʀo.jɐ]	*Roller*	‘roller’
	[ɛɐ̯.tse.lɐ ~ ɛɐ̯.tso.jɐ]	*Erzähler*	‘narrator’
	[heɐ̯.ʃtɛ.lɐ ~ heɐ̯.ʃtɔ.jɐ]	*Hersteller*	‘maker’
	[ve.lɐ ~ ve.jɐ]	*Wähler*	‘voter’
b.	Comparative Adjectives		
	[fɔ.lɐ ~ fɔ.jɐ]	*voller*	‘fuller’
	[ʃnɛ.jɐ][85]	*schneller*	‘faster’
c.	Masculine Nominative Strong Adjectives (-*er*)		
	[pa.ʀa.le.lɐ ~ pa.ʀa.le.jɐ]	*paralleler*	‘parallel’
	[ʃwu.lɐ ~ ʃwu.jɐ]	*schwuler*	‘gay’
	[ʃtaɪ̯.lɐ ~ ʃta.jɐ]	*steiler*	‘steep’

[85] This particular comparative adjective was always produced by the subjects of this study with a vocalized /l/.

d.	Other Masculine Nominative Strong Adjectives		
	[ʃtʊ.jɐ]	*stiller*	‘calm’
	[ʃnɛ.jɐ]	*schneller*	‘fast’
	[ko.jɐ]	*kahler*	‘bald’
	[ho.jɐ]	*hohler*	‘hollow’

The majority of the data with Post-vocalic L-Vocalization in (68a-c) were provided by one subject who is about 45 years old, and his style of speaking the dialect is more often found in generations who are 60 years and older. By contrast, the data in (68d) were attested in the speech of multiple speakers. Because Post-vocalic L-Vocalization is employed (nearly exclusively) by one of several speakers, it is not considered the ‘norm’ for all RG speakers to vocalize /l/ in all contexts except word-initially. Instead, these data show that this expansion of the context of L-Vocalization is possible and prevalent among some speakers, particularly those of older generations. The majority of examples of L-Vocalization, however, are more restricted contextually to coda position (as discussed above).

The vocalization of post-vocalic /l/ in (68) cannot follow from Liquid Vocalization in (23) because that rule specifies a liquid in the coda; as in the data in (7), an intervocalic /l/ syllabifies as a syllable onset and surfaces as [l]. For speakers who vocalize any post-vocalic /l/, I posit the rule in (69):

(69) Post-vocalic L-Vocalization (first version):

/l/ → [j] / V ___

Post-vocalic L-Vocalization in (69) states that an underlying /l/ becomes the glide [j] when it follows a vowel. Although the context for Liquid Vocalization is expanded, in that it is now also occurring in an onset and not simply a coda, it is still necessary to state that this Vocalization is post-vocalic and not context-free because none of my speakers vocalize /l/ in word-initial position. (70) illustrates Post-vocalic L-Vocalization using features. This rule states that when a CORONAL sonorant non-nasal consonant (i.e. /l/) follows a vowel, it becomes [-consonantal]. The output of Post-vocalic L-Vocalization ([j]), is featurally identical to the output of an /l/ which undergoes Liquid Vocalization ([ɪ̯]). In contrast to the glide [j] in a word like *ja* [ja] 'yes', this [j] (from Post-vocalic L-Vocalization) is specified for the feature [nasal]. /ʀ/ does not vocalize in this context (after any vowel, including in an onset), and thus the rule necessarily refers to the place of CORONAL, as opposed to the general rule of Liquid Vocalization from (23), which does not specify place.

(70) Post-vocalic L-Vocalization with Features (final version):

$$\left/\begin{matrix} +\text{son} \\ +\text{cons} \\ \text{COR} \\ -\text{nas} \end{matrix}\right/ \rightarrow \quad [-\text{cons}] \quad / \quad [-\text{cons}]\ \_\_\_$$

It can be observed in the data in (68) that Post-vocalic L-Vocalization occurs before a vocalized /ʀ/. While I only have data in this context, I assume the rule could apply before other vowels as well. Therefore, I do not refer to vocalized /ʀ/ in (70).

As discussed in chapter 1, I follow Glover (2014), who analyzes liquid vocalizations as a response to the Coda Law (Vennemann 1988), particularly that syllable codas with greater sonority are preferred. The Coda Law accounts for Liquid Vocalization in earlier sections but not for the onset vocalizations in the present section. In fact, Glover predicts that "Languages should not have onset liquid vocalizations" (Glover 2014:203). It is not clear what motivates the examples of Post-Vocalic L-Vocalizations in this section; it is clear, however, that they cannot be motivated by the Coda Law.

5.5 Liquid Vocalizations in Other Germanic Varieties

Synchronic and diachronic Liquid Vocalizations have been documented in numerous languages, including other dialects of German. The main difference between BG Vocalization of /l/ and L-Vocalization in related languages is that the vocalized allophone of /l/ in BG is coronal, namely, [ɪ̯]. As I demonstrate below, other Germanic dialects and languages have a back vowel, usually [ʊ̯], as the realization of /l/ in the coda. Data for such vocalizations will be presented and discussed in the following sections.[86]

5.5.1 Synchronic L-Vocalization in Alemannic Dialects

In addition to Bavarian dialects, L-Vocalizations have been documented in many Alemannic German (AG) dialects, typically in Switzerland. See, for example, Haas (1983, 1999) and Christen (1988, 2001). When coda /l/ vocalizes in AG, the surface glide is typically described as a high back glide: [u̯] or [ʊ̯]. For example, the word *viel* 'much' may be realized as [fiu̯] in AG (compare this to RG, where *viel* surfaces as [fuɪ̯]).

Christen (2001) describes AG L-Vocalization as an innovation from western German-speaking Switzerland, which only began surfacing at the beginning of the 20th century.[87] Christen (2001) discusses how L-Vocalization has moved eastwards to the

[86] For extensive discussion of liquid vocalizations in non-Germanic languages (as well as some examples in Germanic), see Proctor 2009.

[87] "Wie eingangs erwähnt, ist die /l/-Vokalisierung eine westschweizerdeutsche Eigenheit, eine junge Erscheinung übrigens, die erst Anfang des letzten Jahrhunderts im Berner Emmental entstanden sein dürfte" (Christen 2001:24).

eastern border of the AG region; she shows that there is variation in this eastern area, where /l/ can optionally surface as [l] or [u̯]. The following table summarizes her findings.

(71) L-Vocalization in three Swiss Dialects (Christen 2001:21)

			Luzern		**Nidwalden (NW) / Uri (UR)**	
			/l/ vocalized	/l/ not vocalized	/l/ vocalized	/l/ not vocalized
a.	*Fels*	‘cliff’	[fœu̯s]	[fɛls]	[feu̯s]	[fels]
b.	*viel*	‘much’	[føu̯]	[fil]	[fiu̯]	[fil]
c.	*Kelle*	‘ladle’	[xœu̯u̯ə]	[xɛllə]	[xeu̯u̯ə]	[xellə]
d.	*Alp*	‘alp’	[au̯p]	[alp]	[ou̯p] (NW) [au̯p] (UR)	[alp]
e.	*Tal*	‘valley’	[taau̯]	[taal]	[toou̯]	[taal]
f.	*alles*	‘all’	[au̯u̯əs]	[alləs]	[ou̯u̯əs]	[alləs]

It can be observed in (71) that /l/ optionally surfaces in several post-vocalic positions in the three AG dialects given. L-Vocalization occurs in a syllable coda word-finally (as in (71b,e)) and in a coda before obstruents, such as [s] and [p] (as in (71a,d)). L-Vocalization also occurs as a geminate glide onset to a second syllable, as shown in (71c,f); compare this to the RG data in section 5.4.3, where Post-vocalic L-Vocalization optionally applied in data such as *Spieler* ‘player’ [ʃpu.jɐ].

As in BG, some AG vowels surface differently before a vocalized /l/ than when /l/ is consonantal [l]. For example, in (71a), /ɛ/ is realized as [ɛ] in the Luzern dialect when /l/ does not vocalize. However, when vocalization occurs, /ɛ/ is realized as front rounded [œ]. In NW and UR, front vowels are not rounded after vocalization; however, /a/ is often realized as [o] after vocalization (see (71d-f)). The RG data with alternate vowels preceding a vocalized /l/ (e.g. /ʃpil/ realized as [ʃpuɪ̯]), which were given in section 5.3.2, were analyzed as a dissimilation because front vowels became dissimilar to the vocalized /l/ in terms of place. On the other hand, the AG data show that L-Vocalization has a labializing effect (*Labialisierung*) on the preceding vowel (Christen 2001:18). That is, there is an *assimilation*, where the vowel preceding vocalized /l/ assimilates the place feature (LABIAL) of the vocalized /l/.

AG L-Vocalization often creates new diphthongs, such as [œu̯] and [eu̯] in *Fels* from (71a) and [øu̯] and [iu̯] in *viel* from (71b). Recall that the same was discussed in section 5.3.1 concerning RG diphthongs derived from vocalizations of /l/ and /ʀ/. Specifically, both BG and AG Liquid Vocalizations produce derived diphthongs which are different from underlying diphthongs.

Glover (2014) provides analysis for AG L-Vocalizations, basing his analysis on data for Bernese German in Keller (1961) and Marti (1985) and for Gotschee German from Tschinkel (1908). Data from Glover (2014) are given in (72); the BG column contains my own data.

(72) L-Vocalizations in German Dialects

SG	**BG**	**Bernese German**	**Gotschee German**	**English**
Tal	[tɔɪ̯]	[ta͡ːu]		'valley'
alt	[ɔɪ̯t]		[ɔ͡ʊt] or [ɔɫt]	'old'

It can be observed that even in the same words *Tal* and *alt*, the BG vocalizations are different from the AG ones: BG vocalized /l/ is a front vowel, while AG vocalized /l/ is a back vowel. Glover (2014) discusses the reason for the back vowel, citing the optional forms in Gotschee German, where coda /l/ can be either the vowel [ʊ] or the velarized lateral [ɫ]. His analysis of AG L-Vocalization discusses features of velarized [ɫ] and the output of vocalization ([u]), and shows how these two segments have the same place features (Glover 2014:196). Glover's (2014) analysis is not unlike Liquid Vocalization given here: Vocalization is shown to be a process which changes [+consonantal] to [-consonantal]. The difference is that AG /l/ must first become velarized before it vocalizes.

5.5.2 English Liquid Vocalizations

In Received Pronunciation (RP) or Standard British English, /r/ vocalizes to a schwa in a coda. Data showing word-final schwa alternating with [r] are given in (73); schwa surfaces phrase finally, while [r] surfaces when the following word is vowel-initial.

(73) Received Pronunciation R-Vocalization (Ortmann 1998)

[spɑɪdə]	*spider*	*the spide*[r] *is*
[fɪə]	*fear*	*in fea*[r] *of*

After vowels such as [ɑ] and [ɔ], /r/ deletes. R-Vocalization also occurs in certain American English dialects, such as along the East Coast and in certain regions of the south; these vocalizations also produce a schwa-like sound. Proctor (2009:36) describes English dialects in the following way:[88] "Speakers of both 'rhotic' and 'non-rhotic' dialects of English may realize post-vocalic /ɹ/ as something more akin to a schwa, with varying degrees of rhoticization: *burr* [bɜr] ~ [bɝ(ɹ)] ~ [bɜɚ] ~ [bɜə] ~ [bɜː]."

[88] He does not cite a source for these data, nor does he specify which English dialects these represent. I assume that these data are intended to account for both RP and American English dialects.

In non-standard varieties of British English, L-Vocalization has also been attested, specifically in the south east, including London (Altendorf 2003), the south west (Proctor 2009), and in the north (Hardcastle & Barry 1989). Data for this are given in (74), where (74a) represents south west England and (74b) northern England.

(74) British English L-Vocalization

a. [bɹɪ.stʊw] *Bristol*

b. [mɪɤk] ~ [mɪʊk] *milk*

These data show that a vocalized /l/ surfaces as some kind of high ([ʊ]) or mid ([ɤ]) back vowel or the glide [w].

In American English dialects with L-Vocalization, /l/ vocalizes and becomes a part of the stem vowel. Data for this are given in (75), where /l/ does not surface word-finally, except when the following word begins with a vowel.

(75) American English L-Vocalization (Gick 2002):

[pɔː] *Paul* [pɔl ɪz] *Paul is*

Gick (2002) also mentions some instances of Post-vocalic L-Vocalization in certain American English dialects (cf. discussion in section 5.4.3 of this vocalization context in RG).[89] (76) contains an illustrative example.

[89] Interestingly, I have also heard some intrusive-/l/ (i.e. non-etymological /l/) in the speech of young children (approximately five years old) in central and southern Indiana. For example, one child produced the form [sɔł] 'saw' at the end of a sentence. While space will not permit for discussion of this here, it is certainly an

(76) Post-vocalic L-Vocalization

[dɔːɚ] *dollar*

In African American English, liquids vocalize in a coda, where both /r/ and /l/ surface as schwa. Data are given in (77), where (77a) shows R-Vocalization and (77b) L-Vocalization. See also Durian (2008) for more discussion.

(77) African American Liquid Vocalizations (Green 2002)

a.	[bæə]	*bear*	b.	[bɜə]	*bell*

Liquid Vocalizations have also been recorded in Australian and New Zealand English. See, for example, Borowsky & Horvath (1997), Borowsky (2001), and Horvath & Horvath (2001). For more discussion of L-Vocalization, see also Johnson & Britain (2007).

5.5.3 Diachronic L-Vocalization in Dutch

In Dutch, there was a diachronic process of L-Vocalization, which can be seen when comparing Dutch to modern West Germanic languages and historic North and East Germanic branches. Data are given in (78), where *l* surfaces in all Germanic languages, except for Dutch, where *u* surfaces.

interesting direction for future research. Additionally, some scholars at Indiana University are investigating pre- and post-vocalic liquids with ultrasound imaging; see, for example, Rhodes et al. (2015).

(78) Dutch L-Vocalization

Dutch	**German**	**Gothic**	**Old Norse**	**English**
goud	*Gold*	*gulþ*	*gull*	‘gold’
zout	*Salz*	*salt*	*salt*	‘salt’

Dutch L-Vocalization is diachronic and can thus be seen in modern spelling. Historic Dutch vocalized /l/ is an [u] sound and surfaces in modern Dutch as the second part of the diphthong [aʊ̯]. Not all historic examples of /l/ in Dutch vocalized, as can be seen when looking at other modern Dutch words, such as *helpen* ‘to help’, where /l/ surfaces after a front vowel. For further discussion of Dutch L-Vocalization, see van Reenen (1986).

5.6 Conclusion

In this chapter, I have presented data and analysis for the unique behavior of the RG liquids /l ʀ/. Specifically, I have given data for vocalized coda liquids and used the features from chapter 3 to analyze Liquid Vocalization. I have also discussed and analyzed Vowel Dissimilation of front vowels preceding a vocalized /l/. Additionally, I have discussed how the liquids interact with other sounds and rules in RG (i.e. Dorsal Fricative Assimilation and Progressive Nasal Place Assimilation), and I have shown issues which arise concerning sonority plateaux with sequences of consecutive liquids. The last section situates the discussion of BG vocalization data in the context of other Germanic vocalizations.

CHAPTER 6

RG HIATUS AVOIDANCE

6.1 Introduction

Although the juxtaposition of two adjacent vowels is attested in the languages of the world (i.e. [V.V]), it is well-known from the literature on phonology that such hiatus sequences are often avoided. Hiatus can arise in several ways. For example, if a vowel-initial suffix is added to a vowel-final stem, the vowels create a hiatus sequence, as in the SG first person singular form of *sehen* 'to see': *sehe* [ze.ə]. Hiatus can also occur across words when a vowel-final word is followed by a vowel-initial word. Additionally, hiatus can surface within a morpheme, such as in the SG word *chaotisch* 'chaotic', where the /a/ and /o/ are adjacent.

There are many possible repairs to hiatus, such as consonant epenthesis or vowel elision (deletion). Below, I present and discuss RG data which show repairs to hiatus sequences, as well as vowels resisting such repairs by surfacing in hiatus. I give data for the first two kinds of hiatus above, i.e. across morphemes within words and across words.[90] The data show great variation: one speaker may employ multiple realizations for a given word or phrase.

The chapter is organized as follows: In sections 6.2-6.4, I discuss repairs for hiatus sequences. In 6.2, I present data and analysis of Homorganic Glide Formation. I discuss

[90] I do not have examples of tautomorphemic hiatus in my corpus, e.g. SG *chaotisch* 'chaotic'. I therefore do not discuss this type of example.

epenthesis of multiple consonants in hiatus sequences in section 6.3, as well as surface hiatus. In 6.4, I show data where Vowel Elision repairs hiatus sequences. I conclude in 6.5.

6.2 Homorganic Glide Formation

When the first vowel in a RG hiatus sequence is either coronal or labial, hiatus is often repaired with a process known as Homorganic Glide Formation, whereby the first vowel spreads place features onto a following vowel, thereby creating a glide. This glide arises via spreading and is therefore not an epenthetic glide, which would not depend on the quality of an adjacent sound. Data for this can be seen in (1-2). In (1), [w] can be observed in the onset to the second word, following a labial vowel. Likewise, [j] surfaces as an onset to a vowel-initial syllable following a coronal vowel in (2). This occurs both across words, as in (2a), and word-internally, as in (2b).

(1) Homorganic Glide Formation with [w]

	Ramsau German	**Standard German**	**English**
	[tso .wam]	*Zoo am*	‘zoo at’
cf.	[tso .am]		
	[do .wɪm]	*da im*	‘there in’
cf.	[do .ɪm]		

(2) Homorganic Glide Formation with [j]

	Ramsau German	**Standard German**	**English**
a.	Across Words		
	[ge .joktsx]	*geh* (2. SG. IMP.) *achtzig*	‘walk eighty’
cf.	[ge .oktsx]		
	[i .je.fɔɪ̯]	*ich Efeu*	‘I ivy’
cf.	[i .e.fɔɪ̯]		
b.	Within Words		
	[ki.jə]	*Kühe*	‘cows’
cf.	[ki.ə]		

The data in (1-2) show two attested realizations for each word or phrase: one with the glide and one without. This indicates optionality, as any given speaker may produce such a sequence with or without a glide. Data below are presented in the same way.

Homorganic Glide Formation also occurs in English (see, for example Trudgill 1986, McCarthy 1993, and Uffmann 2007); representative data are given in (3), where [j] surfaces after non-low front vowels in (3a) and [w] after non-low back vowels in (3b).

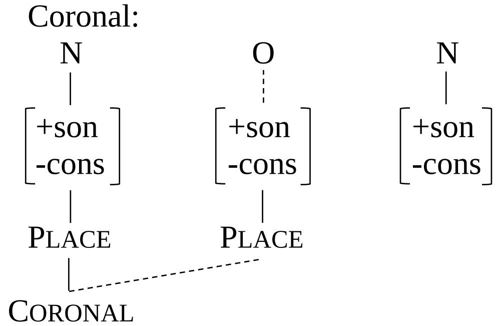
(3) Homorganic Glide Formation in English (Uffmann 2007:463)

a.	The key is	[kiː.**j**ɪz]	b.	The zoo is	[zuː.**w**ɪz]
	The pay is	[peɪ̯.**j**ɪz]		The show is	[ʃəʊ̯.**w**ɪz]

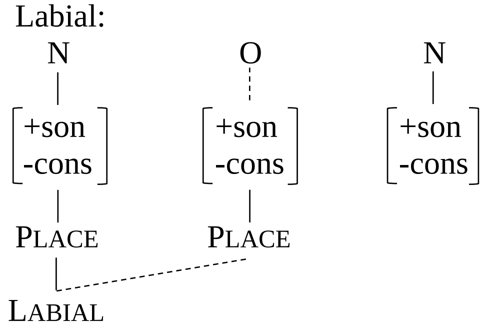
A rule accounting for the RG data in (1-2) is given in (4).

(4) Homorganic Glide Formation (HGF)

a. Coronal:



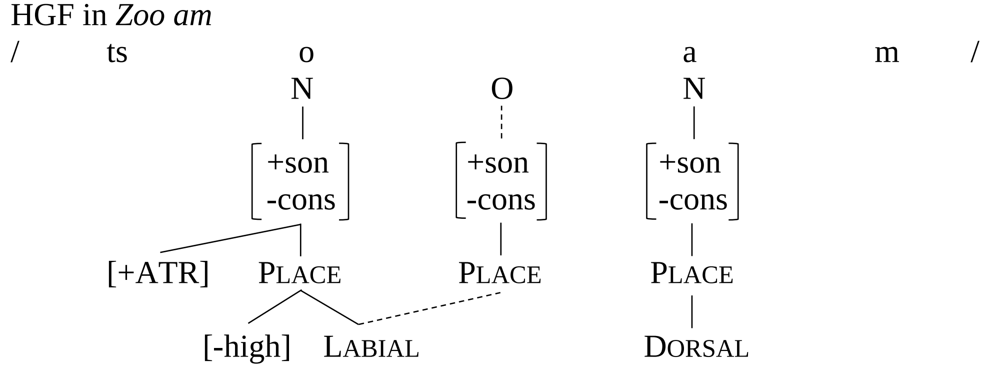
b. Labial:



Homorganic Glide Formation (HGF) in (4a) states that when two syllabic vowels are in hiatus, CORONAL spreads rightward from the first vowel onto PLACE of a following vowel. HGF of [w] is given in (4b), where LABIAL spreads from the first vowel onto a following vowel. The vowels in hiatus are necessarily marked as nuclei because HGF does not apply to diphthongs, such as [ɔɪ̯], where both [-consonantal] ROOTS belong to one nucleus. HGF also does not apply to the derived diphthongs discussed in chapters 3 and 5 because these diphthongs do not fit the structural description of the rule in terms of syllables. In diphthongs derived via Diphthongization, both [-consonantal] ROOTS belong to one nucleus, while in diphthongs derived via Liquid Vocalization, such as [uɪ̯] in [ʃpuɪ̯n] *spulen* 'to wind', the second member (the glide) is in the coda.

Uffmann (2007:463) notes that English HGF only occurs after [+high] vowels; Uffmann also shows how all dependent features of place spread from the first vowel. This is not the case in RG, as can be seen in examples like *Zoo am* [tso .wam] in (1), where HGF occurs after the mid vowel [o]. In RG, only the place features CORONAL or LABIAL spread via HGF (not all dependent place features, such as [high]). The application of HGF in the phrase *Zoo am* is given in (5).[91]

(5) HGF in *Zoo am*



[91] Only features of vocalic segments are given here, as the consonants do not bear on analysis of HGF.

As shown in (5), LABIAL spreads from the PLACE node of /o/ onto the PLACE node of the glide [w]. The following section presents another repair to hiatus.

6.3 Consonant Epenthesis

As shown in chapter 1, consonant epenthesis is often discussed in the phonological literature, particularly with respect to markedness. One question discussed in the theoretical literature is whether or not it is possible to predict which consonant is epenthetic (e.g. Lombardi 2002 and de Lacy 2006, among others). Casali (2011:1437) presents the following three options for cross-linguistic consonant epenthesis (in the context between vowels):

(6) Potential Consonant Epenthesis

a. A semivowel, usually one that is homorganic with (i.e. shares the same frontness or roundness as) V_1 or V_2.

b. A glottal stop ([ʔ]) or fricative ([h]).

c. A coronal consonant, generally [t] or a rhotic.[92]

Interestingly, RG employs all of these possibilities. Data for (6a) were discussed in the previous section on HGF; in this section, I present examples of (6b,c) in RG. The section concludes with a series of open questions relating to epenthetic consonants as hiatus breakers.

[92] Casali refers to a coronal rhotic, but the RG rhotic is dorsal (recall the features given in chapter 3). The place of articulation of epenthetic consonants will be discussed below.

BG is often cited as a language with productive R-Epenthesis, as in English (see Gutch 1992, Uffmann 2007, and discussion in chapter 1); however, data illustrating BG R-Epenthesis in the literature are limited, and most of these come from Schmeller's (1821) grammar. Later authors (Zehetner 1985, Merkle 2005) cite mostly the same data given in Schmeller (1821). In (7), I present examples from my subjects, where they produced R-Epenthesis after non-coronal, non-labial vowels in words and phrases from Schmeller (1821), Zehetner (1985), and Merkle (2005).

(7) RG R-Epenthesis[93]

	Ramsau German	Standard German	English
a.	Compound Word		
	[tswa.ʀə.tswansk]	*zweiundzwanzig*	'twenty-two'
	[tswa.ʀə.dʀa̯ɪsk]	*zweiunddreißig*	'twenty-three'
cf.	[tswa] [ʊn]	*zwei, und*	'two', 'and'
b.	Declined/Conjugated Word		
	[i ʃtʀa.ʀət]	*ich streuete*	'I scattered'
cf.	[i ʃtʀa.ət]		
c.	Phrase		
	[dʀa .ʀi]	*dra ich*	meaning unclear
cf.	[dʀa .i]	*ich*	'I'
	[dan tuə̯ .ʀi]	*Dann tue ich.*	'Then I do (it).'
cf.	[dan tuə̯ .i]		

[93] In the literature on BG, authors also cite examples of R-Epenthesis following words such as *Schuhe* 'shoes'. For example, Zehetner (1985:88) gives the sentence <ziag d Schua-r-aus!> *Zieh die Schuhe aus!* 'Take your shoes off!', where /r/ is epenthesized after *Schuhe* and before a vowel-initial word. In phrases with such morphemes, my subjects produce a dorsal fricative: [tsiə̯x di ʃuʊ̯x̠ .aʊ̯s] *Zieh die **Schuhe aus!*** 'Take your shoes off!' and [do seə̯.x̠ɪ] *Da **sehe ich**…* 'I see [the man] there.' These cannot be examples of R-Epenthesis (or [x] Epenthesis either) because these morphemes end in the dorsal fricative in isolation. For example, when the word *Schuhe* is read in a list, it is produced as [ʃuʊ̯x]; that is, even when no vowel-initial word follows, the dorsal fricative surfaces. Therefore, such data do not show epenthesis of a consonant to break up hiatus, but rather, the dorsal fricative is in the underlying representation.

I also elicited a limited number of new examples of R-Epenthesis not cited in the previous literature. These are given in (8).

(8) New RG R-Epenthesis

	Ramsau German	Standard German	English
a.	Within a Word		
	[bɪnt.sa.ʀɐ]	*Bindsaher*	meaning unclear
cf.	[bɪnt.sa.ɐ]		
	[eɐ̯ ʃtʀa.ʀət]	*er streuete*	'he scatters'
cf.	[eɐ̯ ʃtʀa.ət]		

In (7-8), [ʀ] surfaces as the onset to a vowel-initial syllable following either [a] or [ɐ̯]. One speaker did not produce all examples of epenthesis in (7-8), nor are the optional pronunciations without [ʀ] all from one individual. Each speaker produced some examples of epenthesis as well as some examples without epenthesis. Except for the data in (7a),[94] epenthesis of [ʀ] is optional. See, for example, *dra ich* in (7c), which is realized with and without [ʀ].

The examples of R-Epenthesis given above were restricted to applying after non-coronal and non-labial vowels (i.e. in the context where HGF does not occur). However, RG R-Epenthesis also occurs after coronal and labial vowels, as can be seen in the following data set.

[94] These examples are discussed further below.

(9) Other R-Epenthesis

	Ramsau German	**Standard German**	**English**
a.	After a Coronal Vowel		
	[vi .ʀə ɔɪ̯.tɐ]	*wie ein Alter*	‘like an old man’
	[vi .ʀə fʀaʊ̯]	*wie eine Frau*	‘like a woman’
cf.	[vi .ə]	*wie ein/eine*	‘how a’
	[vi .ʀə ke.mə is]	*...wie er gekommen ist.*	‘how he came’
cf.	[vi .eɐ̯]	*wie er*	‘how he’
	[vi .ʀi sok]	*wie ich sage*	‘like I say’
cf.	[vi .i]	*wie ich*	‘how I’
b.	After a Labial Vowel		
	[fʀʊ.ʀɐ]	*früher*	‘earlier’
cf.	[fʀi.ɐ][95]		
	[tsu .ʀə.nant]	*zu einander*	‘to one another’
cf.	[tsu] [ə]	*zu, ein*	‘to’, ‘one’

Epenthetic [ʀ] surfaces after a high coronal vowel in (9a) and after high labial vowels in (9b). It is not clear why epenthesis of [ʀ] – and not HGF – is occurring here. One possibility is that the optionality of HGF (shown above) includes not only (non)application of HGF, but also extends to allowing other RG segments to epenthesize in the context of the rule. If this is the case, it is unsurprising that not all tokens with [i.V] (for example) have an intervening [j].

A rule of R-Epenthesis is given in (10), which states that [ʀ] is inserted between two syllabic vowels.

(10) R-Epenthesis

$$\emptyset \rightarrow [\text{ʀ}] \;/\; \begin{array}{c}\text{N}\\ | \\ [\text{-cons}]\end{array} \;\_\_\_\; \begin{array}{c}\text{N}\\ | \\ [\text{-cons}]\end{array}$$

[95] Recall discussion in chapter 3 that SG umlauted vowels (e.g. [y] in SG [fʀyɐ]) generally occur as BG front unrounded vowels. However, some speakers occasionally produce SG umlauted vowels as RG back rounded vowels. I do not consider this to be a factor for why this word is sometimes produced with R-Epenthesis and at other times with hiatus in these two examples.

Another type of epenthetic consonant in German dialects is the glottal stop [ʔ]. In SG, vowels never occur word-initially; rather, there is a process of Glottal Stop Epenthesis, whereby the glottal stop is inserted before a word-initial vowel (Wiese 1996, Alber 2001). Representative data are given in (11).[96]

(11) Glottal Stop Epenthesis in SG

	Standard German	English
	[ʔ]Atem	'breath'
	[ʔ]offen	'open'

BG, on the other hand, does not have an obligatory process of Glottal Stop Epenthesis before an initial vowel (Gutch 1992:572, Alber 2001, Kabak & Schiering 2006). The glottal stop may be epenthesized before a vowel-initial word, but this is not mandatory. See, for example, the data in (12).

(12) Utterance-initial Glottal Stop

	Ramsau German	Standard German	English
	[ʔi hɛt geɐ̯n]	*Ich hätte gern...*	'I would like...'
cf.	[i hɛt geɐ̯n]		
	[ʔeɐ̯ mok]	*Er mag…*	'He likes…'
cf.	[eɐ̯ mok]		

In (12), the glottal stop optionally surfaces in utterance-initial position. The glottal stop can also be epenthesized between vowels belonging to separate words, as in the data in (13).

[96] Wiese (1996) and Alber (2001) discuss another context for SG Glottal Stop Epenthesis: word-internally before a stressed vowel, as in the word *cha*[ʔ]ˈ*otisch* 'chaotic'. Wiese and Alber claim that the two contexts can be collapsed to a foot-initial position. As Alber (2001) shows, this word-internal context for Glottal Stop Epenthesis does not apply to 'Southern German', which includes Austrian German. I have no words like *chaotisch* with adjacent tautomorphemic vowels where one finds the glottal stop in SG. Glottal Stop Epenthesis is predicted not to apply in this context (based on Alber 2001).

(13) [ʔ] Epenthesis

	Ramsau German	Standard German	English
a.	After schwa		
	[kniə̯ .ʔʊn.təm]	*Knie unter dem*	‘knee under the’
cf.	[kniə̯ .ʊn.təm]		
	[ə .ʔo.pa]	*ein Opa*	‘a grandpa’
cf.	[ə .o.pa]		
	[ə .ʔɔɪ̯.lə]	*eine Eule*	‘an owl’
cf.	[ə .ɔɪ̯.lə]		
b.	After a Coronal Vowel		
	[ge .ʔoktsx]	*geh* (2. SG. IMP.) *achtzig*	‘walk eighty’
cf.	[ge .joktsx]		
c.	After a Labial Vowel		
	[do .ʔɪm]	*da im*	‘there in’
cf.	[do .wɪm]		

The glottal stop optionally surfaces before a vowel-initial word in (13) when the previous word ends in a vowel of any kind. Each example in (13) involves two separate words.

Glottal Stop Epenthesis (see (14)), applies before a vowel-initial prosodic word. This accounts for data where [ʔ] is epenthesized utterance-initially (as in (12)) and intervocalically (as in (13)).

(14) Glottal Stop Epenthesis

$$\emptyset \rightarrow [\text{ʔ}] \;/\; \underline{\quad\quad}\ {}_{\text{PrWd}}[\ \overset{\text{N}}{\overset{|}{[\text{-cons}]}}$$

The phrases in (13b,c) with Glottal Stop Epenthesis were given at the beginning of section 6.2, exhibiting HGF. Therefore, the data in (13) show that there are multiple options for repairing hiatus. See discussion below on optionality.

Merkle (2005: 30) and Zehetner (1985: 88) also give other consonants as epenthetic in BG: [n d]; data for this are provided in (15).

(15) Other BG Epenthetic Consonants

	Bavarian German	Standard German	English
a.	wo-n-i	*wo ich*	'where I' (M)
	dua-n-e	*dann tue ich*	'then I do' (Z)
b.	jetzà-d-awà	*jetzt aber*	'now, however' (M)

As with Glottal Stop Epenthesis, these examples involve two separate words. My RG subjects also produced instances of [n] Epenthesis, which are given in (16). Below each example with epenthetic [n], there is an example where another repair is employed: in these same phrases, a glottal stop can be epenthesized, or after a high vowel, HGF can apply.

(16) [n] Epenthesis

	Ramsau German	Standard German	English
	[bə .nɪm.kɐ][97]	*bei Imkern*	'by beekeepers'
cf.	[bə .ʔɪm.kɐ]		
	[se.çi .ne.fɔɪ̯]	*sehe ich Efeu*	'I see ivy'
cf.	[se.çi .je.fɔɪ̯]		

On the basis of the comparative examples in (16), [n] cannot be part of the underlying representation. Therefore, the data suggest that [n] is epenthetic. A rule of [n] Epenthesis is given in (17), which states that an [n] is inserted between two vowels across the word boundary.

[97] It is possible that this particular example is not [n] Epenthesis, but rather a realization with the dative plural definite article: *bei den Imkern* 'by the beekepers'.

(17) [n] Epenthesis

$$\begin{array}{ccccccc} & & & & \text{N} & & \text{N} \\ & & & & | & & | \\ \text{Ø} & \rightarrow & [\text{n}] & / & [\text{-cons}] & \underline{\quad\quad}\ {}_{\text{PrWd}}[& [\text{-cons}] \end{array}$$

I consider the repairs discussed above to be a response to a constraint against hiatus, which bans two adjacent syllabic vowels. This is given in (18). No Hiatus specifically states that the two vowels are nuclear, as there is no constraint against adjacent [-consonantal] segments in one nucleus (e.g. underlying diphthongs) or when two [-consonantal] segments are in a nucleus and coda (e.g. diphthongs produced via Liquid Vocalization).

(18) No Hiatus

$$\begin{array}{cc} \text{N} & \text{N} \\ | & | \\ {}^{*}[\text{-cons}] & [\text{-cons}] \end{array}$$

There are several open questions concerning consonant epenthesis in RG. First, the consonant epenthesis rules discussed here are optional. This predicts that there should be an epenthetic [ʀ], [ʔ], and [n] in the same context: in hiatus sequences when the second vowel is the onset of a prosodic word. HGF should also be able to apply if the first vowel is CORONAL or LABIAL. Therefore, I predict that there should be phrases with [VʀV] which can also surface as [VʔV] or [VnV]. For example, I predict that the phrase *zu einander* (which surfaces with R-Epenthesis in (9b)) could undergo HGF and surface as [tsu .wə.nant]; alternately, Glottal Stop Epenthesis or [n] Epenthesis could apply, producing [tsu .ʔə.nant] or [tsu .nə.nant]. Unfortunately, I cannot confirm this in my corpus, as I do not have examples of phrases where all of these repairs occur. However, I do have examples where HGF and Glottal Stop Epenthesis apply in the same phrases (see (13b,c)).

Although the repairs above (HGF and consonant epenthesis) occur frequently, RG often violates the No Hiatus constraint in (18): each speaker produces surface hiatus sequences in about half of the tokens I collected. See, for example, the data in (19). Hiatus occurs across words in (19a) and within words in (19b).

(19) RG Vowels in Hiatus

	Ramsau German	**Standard German**	**English**
a.	Across Words		
	[vi .i sok]	*wie ich sage*	‘like I say’
cf.	[vi .ʀi sok]		
	[ə .o.pa]	*ein Opa*	‘a grandpa’
cf.	[ə .ʔo.pa]		
	[ge .oktsk]	*geh achtzig*	‘walk eighty’
cf.	[ge .joktsx]		
b.	Within Words		
	[fʀi.ɐ]	*früher*	‘earlier’
cf.	[fʀʊ.ʀɐ]		
	[ki.ə]	*Kühe*	‘cows’
cf.	[ki.jə]		

Each example of hiatus in (19) occurs across a morpheme boundary. There are no constraints on the quality of either the first or second vowel in hiatus sequences.

If all repairs are optional (as argued above), then I expect that hiatus is realizable in all non-lexicalized examples illustrating epenthetic consonants. This is shown explicitly in the data presented above: for each example of hiatus in (19), there is a comparative example with one of the (optional) repairs. There might be some kind of sociolinguistic factor(s) which account for hiatus data. For example, one task my subjects completed was reading a list of vowel-initial nouns four times, at a quicker rate with each reading. Each noun was preceded by the indefinite article *ein* [ə], such as *ein Opa* ‘a grandpa’ (see the example in (19a)). Subjects often repaired the hiatus sequence with Glottal Stop Epenthesis during the first and second (slower) readings. By the third and fourth (faster) readings, however, no repair was employed; instead, the subjects produced hiatus between the article and noun each time. Therefore, rate of speech may bear on whether or not subjects repair hiatus. Other socio-linguistic variables may also play a role in the optionality of hiatus resolution; however, I do not know what these variables are. Therefore, it appears that epenthesis is optional, when it may indeed be obligatory. More research would be needed to ascertain this.

In order to show the prevalence of hiatus in Central Bavarian, Merkle (2005) gives the string of vowels in (20).[98] He considers hiatus resolution as entirely optional and does not comment on other sociolinguistic factors.

(20) Multiple Vowels in Hiatus (from Merkle 2005)

Bavarian German	**Standard German**	**English**
na wui i àà õã Oà	*dann will ich auch ein Ei*	‘then I also want an egg’

Further discussion of optionality, including frameworks which can account for it, are given in chapter 7.

[98] „*Der Gebrauch – oder besser: der Nichtgebrauch – des Bindelauts liegt im großen und ganzen im Ermessen des einzelnen. Wer zwei Vokale, statt sie gleitend zu verbinden, unverbunden ausspricht, begeht keinen Fehler ... Trotz der schönen Bindungsmöglichkeiten nämlich ist der Hiatus im Bairischen nicht selten und verstößt nicht wider die Harmonie des Klanges*“ (Merkle 2005:33). ‘The use – or better yet: the nonuse – of a linking sound [epenthetic consonant] depends entirely on the discretion of the individual. Whoever speaks two vowels unconnected, instead of connecting them [with an epenthetic consonant], commits no mistake … Despite the lovely connecting possibilities, hiatus is not uncommon in Bavarian and does not transgress against the harmony of the sound.’

A related question concerns the productivity of consonant epenthesis, particularly epenthesis of [ʀ] and [n]. Although there are various definitions for productivity in the literature, one common criterion is that the rule will apply in recent loan words and in nonce words, provided these examples satisfy the structural description of the rule (Hayes 2009). Recent loans and nonce words were not a part of the corpus, and therefore the question of whether or not R-Epenthesis and [n] Epenthesis in RG are productive will need to remain open for further study.

Additionally, it is unclear how regular [n] Epenthesis is in RG, as my subjects only produced a few examples of this. That is, there are examples of hiatus in RG where one might expect to see [n] inserted, but there is, in fact, no [n]. For example, in a phrase like *ein Opa* from (13a), there could optionally be [n] Epenthesis, such as [ə .no.pa], although this does not surface in my corpus.

As shown in chapter 1, certain dialects of English also have R-Epenthesis. On the basis of examples like *law[r] and order* (cf. *law* in isolation without epenthetic [r]), English R-Epenthesis is productive. However, Hall (2013) investigates ten languages claimed to have R-Epenthesis as in English and concludes that "none of the original sources makes it unambiguously clear that there is a regular, morphologically-unrestricted synchronic process of R-Epenthesis in those languages which is parallel to the one attested in English" (Hall 2013:12). Hall therefore argues that English is probably unique. If further study reveals that RG R-Epenthesis is not productive, or that it is morphologically restricted, this supports Hall's (2013) claim.

Another open question is whether or not the epenthetic consonants given above are synchronically derived or simply lexicalized. As mentioned above, for each example of epenthetic [n] in (16), there was an example without [n]; thus, [n] should not be considered part of the underlying representation (i.e. [n] is not lexicalized). However, there were very few data of [n] Epenthesis, so more data would help to clarify the status of epenthetic [n]. It was also noted that Zehetner (1985) and Merkle (2005) recorded data for [d] Epenthesis (cf. (15)). There is a possibility that data for epenthetic [d] are lexicalized in BG; however, such data would need to be collected and analyzed in order to be sure. It is fairly certain that the glottal stop is not lexicalized, as there are plenty of examples in (13) where the glottal stop optionally fails to epenthesize (here hiatus surfaces or HGF applies).

While epenthetic [n d ʔ] may not be lexicalized, there is the potential that some examples of R-Epenthesis are. For example, although there is no /ʀ/ in either *zwei* or *und* in isolation, it could still be the case that there is /ʀ/ in a RG word like *zweiundzwanzig* from (7a). Compare this to a SG word like *woran* ‘whereby’ with underlying /ʀ/, while *wo* ‘where’ and *an* ‘on’ have no /ʀ/. As the words in (7a) were always produced by each speaker with epenthetic [ʀ], I consider the examples in (7a) to be lexicalized: the underlying representations for those compound words contain /ʀ/.

Other data in (7-9) surface optionally with and without epenthetic [ʀ]. However, data in (7) and (9) show that R-Epenthesis only surfaces between words when the second word is a function word: ‘a’, ‘he’, and ‘I’. Thus, it appears that R-Epenthesis is restricted to a certain part of speech. As I do not have data in which the second word is not a function word, I cannot be certain of this and therefore must leave this question open. These facts concerning RG R-Epenthesis are different from the equivalent English rule, which is insensitive to lexical category of the second word (see discussion in McCarthy 1993).

RG data motivating consonant epenthesis can also potentially shed light on questions discussed in the literature on phonological markedness. Recall that de Lacy (2006) and Rice (2007) conclude that a segment which is epenthesized will be unmarked. De Lacy (2006:28) states this generalization in the following way:

> **Consonant Epenthesis**: If consonant [α] is epenthesized and [β] is not, then there is some markedness hierarchy in which [β] is more marked than [α].

According to the generalization above, epenthetic consonants in RG should be unmarked along a certain dimension. Two dimensions of markedness will be explored here: Place of Articulation (PoA) markedness and manner markedness.

Scholars have often discussed coronal as an unmarked PoA (see Paradis & Prunet 1991). However, Lombardi (2002) argues for glottal as the most unmarked PoA. See, for example, the place hierarchy in (21), which was discussed in chapter 1:

(21) Universal Place Hierarchy: *DORS, *LAB » *COR » *PHAR
(Lombardi 2002:221)

This hierarchy predicts that glottal segments (which fall under the place of PHARYNGEAL on this scale) should be the most likely epenthetic consonants in any given language because of their unmarkedness in terms of PoA. The next most unmarked consonants (along the dimension of PoA) in (21) are coronal. Many authors argue that labial and dorsal are the most marked PoA's, and some even predict that labial and dorsal consonants (regardless of their manner) cannot be epenthetic (de Lacy 2006:79,108).

These statements concerning PoA markedness make the RG data for consonant epenthesis interesting. As discussed above, RG has optional epenthesis of [ʔ n ʀ] (and possibly [d]). The glottal stop is uncontroversial as an epenthetic consonant, as it has the most unmarked PoA; epenthetic [n], which is coronal, also causes no issues in terms of PoA markedness. Dorsal [ʀ], however, is predicted to be an impossible epenthetic segment (cf. de Lacy 2006). The PoA for RG epenthetic [ʀ] is another difference between RG and the data cited in the literature: RG [ʀ] is uvular, while the epenthetic /r/ in English (and other languages) is described as coronal. That RG underlying /ʀ/ and epenthetic [ʀ] are both uvular suggests that RG R-Epenthesis is structure preserving (Kiparsky 1985, Steriade 1995).

The RG data also bear on the topic of manner markedness, as epenthetic segments include four manners of articulation: a stop [ʔ],[99] nasal [n], liquid [ʀ], and glides [j w]. When authors discuss manner markedness, they are referring to principles of sonority. Recall the sonority hierarchy discussed in previous chapters, repeated in (22).

(22) Sonority Hierarchy (Clements 1990)

vowels > glides > liquids > nasals > obstruents

According to the SSP (Selkirk 1984, Blevins 1995, Zec 2007, among others), syllables rise in sonority from onset to nucleus and fall in sonority to the coda. Thus, a markedness hierarchy can be created which adheres to the SSP; for example, less marked onsets will be lower in sonority (i.e. obstruents). Uffmann (2007) presents an analysis along these lines

[99] As well as potentially [d].

(in what he terms ‘segmental prominence’), where the predicted manner of articulation depends on syllabic position. Following Uffmann (2007), the glottal stop should only epenthesize word-initially, as this is a margin position where lower sonority segments are more preferred. Conversely, [r] (and glides) should epenthesize intervocalically, as this is a peak position where higher sonority segments are preferred. Thus, different manners are predicted to epenthesize in different syllabic positions. However, the RG data show that any of the four manners of consonant mentioned above may epenthesize in hiatus before a word-initial vowel.

De Lacy (2006) also investigates manner markedness of epenthetic segments in terms of syllabic structure. His analysis accounts for the epenthetic rhotics and glides by stating that they are “partially assimilated in manner of articulation to adjacent vowels” (de Lacy 2006:101). This requires that [r] can only be epenthetic when one of the vowels in hiatus is low.[100] Additionally, de Lacy concludes that “…the theory cannot produce a language with an epenthetic nasal in onsets…” (de Lacy 2006:103).[101] Thus, de Lacy’s (2006) analysis of consonant epenthesis cannot account for either data of [n] Epenthesis or R-Epenthesis when neither vowel in hiatus is [a] (cf. [vi .ʀi sok] from (9a), where [ʀ] epenthesizes between two high vowels).

In sum, neither of the analyses in de Lacy (2006) and Uffmann (2007) can account for all of the RG epentheses above (i.e. [ʔ n ʀ j w]) in terms of manner markedness or PoA markedness. Additionally, the uvular rhotic would never be an allowable epenthetic

[100] It appears that de Lacy’s (2006:101) discussion about manner markedness of epenthetic consonants is conflated with discussion of PoA of an adjacent vowel. I handle discussion of PoA for vowels in hiatus separately below.

[101] De Lacy (2006:104) also states that there will never be an epenthetic voiced stop in any language. Thus, he predicts that Zehetner’s (1985) and Merkle’s (2005) epenthetic [d] in (15) should not occur.

consonant in de Lacy's (2006) model, based on his PoA markedness constraints. This raises the question of which hierarchy or markedness dimension could account for all of the epenthetic segments in RG. I leave this open for future research.

One final note about markedness concerns the vocalic context before epenthetic [ʀ]. As discussed in chapter 1, English dialects which exhibit R-Epenthesis only insert /r/ after a low vowel; after other vowels, HGF occurs (see McCarthy 1993, Uffmann 2007, and Hall 2013). Uffmann's (2007) analysis predicts that highly sonorous segments should resolve hiatus, and therefore, when HGF is blocked (in the context of after low vowels), /r/ is the next best epenthetic consonant because of its high sonority (see also de Lacy 2006:101-103, who gives a similar analysis for R-Epenthesis in Southern Tati). It was shown in (9), however, that RG R-Epenthesis occurs after high vowels (where HGF is predicted). See, for example, data such as [vi .ʀi sok] *wie ich sage* 'like I say' and [tsu .ʀə.nant] *zu einander* 'to one another', where [ʀ] epenthesizes after the high vowels [i u]. It is unclear how any of the analyses for R-Epenthesis discussed above could account for these facts; I therefore leave this topic open for the future.

The following section explores one other repair to RG hiatus.

6.4 Vowel Elision

As mentioned above, RG hiatus sequences often undergo Vowel Elision: when two underlying vowels are adjacent, one can optionally delete, and a single long vowel surfaces; this is underlined in the phonetic transcription for RG in (23). Recall from chapter 3 that all surface long vowels in RG are derived segments.

(23) Vowel Elision

	Ramsau German	Standard German	English
	[doːk.sn̩]	*du Ochsen*	‘you oxen’
cf.	[du .ok.sn̩]		
	[saː]	*säh auch*	‘sow also’
cf.	[sa .a]		
	[iːs]	*ich esse*	‘I eat’
cf.	[i .is]		
	[bɪ.təː]	*bitte ein*	‘please, a’
cf.	[bɪ.tə .ə]		

In (23), the first word ends in a vowel, and the second begins with a vowel. When these words are adjacent in a phrase, one long vowel optionally surfaces: one vowel elides, and the remaining vowel is lengthened via a process of Compensatory Lengthening (Hayes 1989), which is not uncommon in the languages of the world. For examples of Vowel Elision followed by Compensatory Lengthening in other languages, see Casali (1997:506-508). Rules of Vowel Elision and Compensatory Lengthening are given below using X theory (Levin 1985, Lowenstamm & Kaye 1986, Hayes 1989). Under X theory, each short segment receives one X and each long segment receives two X’s (such as the long vowels in (23)).[102] Vowel Elision states that two adjacent syllabic vowels are realized as one syllabic vowel and an unaffiliated X slot.

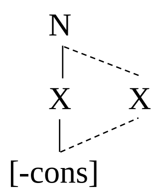
(24) Vowel Elision

$$\begin{array}{cc} \text{N} & \text{N} \\ | & | \\ \text{X} & \text{X} \\ | & | \\ [\text{-cons}] & [\text{-cons}] \end{array} \quad \rightarrow \quad \begin{array}{cc} \text{N} & \\ | & \\ \text{X} & \text{X} \\ | & \\ [\text{-cons}] & \end{array}$$

[102] This analysis could also be expressed in moraic theory (Hyman 1984, 1985, McCarthy & Prince 1986, Hayes 1989). I do not contend that one framework is superior; I simply use X theory here to illustrate how Vowel Elision and Compensatory Lengthening function in RG.

It is not clear from the data in (23) which vowel elides in RG: the first or the second. It is possible that, depending on various factors, the first vowel elides in certain instances, and other times the second elides. For explanations of why certain vowels might elide and others not, see discussion in Casali (1997). The rule in (24) does not show the actual elision process; however, I consider Vowel Elision to be a delinking of either the first or the second vowel from its nucleus, which leaves the unaffiliated X slot shown in (24). I see Vowel Elision as a response to the hiatus constraint from section 6.3. The output of Vowel Elision is the input to Compensatory Lengthening in (25):

(25) Compensatory Lengthening (adapted from Hayes 1989:261)



Compensatory Lengthening states that a vowel attaches to an unaffiliated X slot; this X slot, in turn, attaches to the vowel’s nucleus. Since vowels do not have contrastive length specifications in RG (see chapter 3), it is perceptible when vowels are elongated via Compensatory Lengthening.

As discussed in chapter 5, when a liquid vocalizes, it is realized as a glide in a derived diphthong. For example, an underlying sequence such as /al/ is realized as [aɪ̯], when the /l/ is in the coda. When liquids vocalize word-finally before a vowel-initial word, they create a derived hiatus sequence, and these instances are optionally repaired with Vowel Elision. Representative data are presented in (26-27).[103]

(26) Vowel Elision with Underlying /l/

Words in Isolation		**RG**	**SG**	**English**
[vʊɪ̯]	[ɛ.tvəs]	[vɪː.tvəs]	*will* (1. SG.) *etwas*	'want something'
[mo.dɛɪ̯]	[ɪm]	[mo.dɛːm]	*Modell im*	'model in'

(27) Vowel Elision with Underlying /ʀ/

Words in Isolation		**RG**	**SG**	**English**
[ɛɐ̯]	[is]	[ɛːs]	*er ist*	'he is'
[dɛɐ̯]	[opa]	[doː.pa]	*der Opa*	'the grandpa'
[fiɐ̯]	[ʊns]	[fɪːns]	*führ* (2. SG. IMP.) *uns*	'drive us'

In (26) and (27), the data in the RG column show a surface long monophthong for a sequence of underlying vowel plus /l/ or /ʀ/, and a following vowel. For example, in the phrase *Modell im* from (26), the underlying sequence of /ɛ l/ (in *Modell*) plus /ɪ/ (in *im*) is realized as [ɛː], where the surface vowel has undergone Vowel Elision and Compensatory Lengthening. These data can be compared to those in (28), where Vowel Elision does not occur.

[103] It can be observed in (26-27) that two of the long vowels ([ɛː] and [ɪː]) are lax. See also *bitte ein* from (23), which has a long schwa, which is not specified for [ATR]. There is a cross-linguistic tendency for long vowels to be tense (see Kenstowicz 1994:17 for English). However, these derived long vowels are an exception to this generalization.

(28) No Repair to derived Hiatus

	Ramsau German	Standard German	English
a.	/l/		
	[ʃnɛɪ̯ .ʊn]	*schnell und*	‘fast and’
	[kfuɪ̯ .ɛɐ̯nst]	*Gefühl ernst*	‘emotion genuine’
b.	/ʀ/		
	[fiɐ̯ .ʊns]	*führ* (2. SG. IMP.) *uns*	‘drive us’
	[uɐ̯ .i.bɐ]	*Uhr über*	‘clock over’

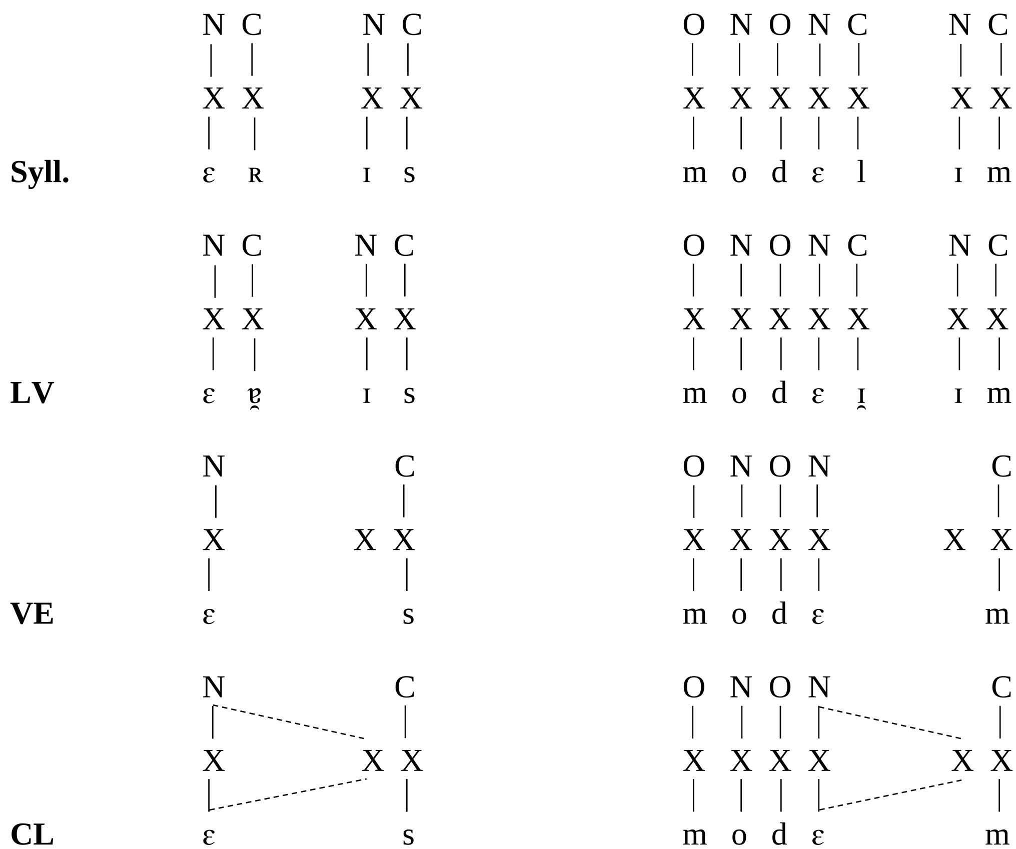
I do not have data in my corpus for the realizations of /l/ and /ʀ/ for each example in (28) as the /l/ and /ʀ/ in (26) and (27); however, I predict that speakers should be able to do both. I also predict that what can be observed in (28) should also be true for (26) and (27) (cf. *führ uns* in (27) and (28b)). Thus, Vowel Elision is an optional repair to hiatus, as are HGF (from section 6.2) and epenthesis of [ʔ n ʀ] (from section 6.3).

Vowel Elision in (26-27) is captured with the rule in (24); the only difference is that in (26-27), the glide produced via Liquid Vocalization deletes as well as one of the syllabic vowels. A derivation showing the interaction of Liquid Vocalization, Vowel Elision, and Compensatory Lengthening is given in (29).[104]

[104] The abbreviations used here are as follows: UR = Underlying Representation, Syll. = Syllabification, LV = Liquid Vocalization, VE = Vowel Elision, CL = Compensatory Lengthening, and PR = Phonetic Representation.

(29) a. *er ist* b. *Modell im*

UR /ɛʀ ɪs/ /modɛl ɪm/



PR [ɛːs] [mo.dɛːm]

Syllabification (recall discussion in chapters 3-5; see also Kenstowicz 1994:253-4) parses the word-final liquids /ʀ/ and /l/ into codas, thereby feeding Liquid Vocalization. Liquid Vocalization, in turn, feeds Vowel Elision, which applies twice (to the glide output of Liquid Vocalization and to the word-initial vowel) leaving an X slot unaffiliated. The unaffiliated X slot links to the remaining vowel (and nucleus) via Compensatory Lengthening. Thus, Vowel Elision feeds Compensatory Lengthening.[105]

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[105] Another way to describe the process of Vowel Elision is Monophthongization – where multiple vocalic root nodes become one. Monophthongization is neither uncommon nor undocumented in the history of diachronic German, so it is not surprising that it surfaces as a synchronic rule in RG.

One exception to RG Vowel Elision is the indefinite article *ein*, typically produced as [ə]. When *ein* precedes a vowel-initial word, it does not delete, as the data in (30) illustrate.

(30) List of Vowel-Initial Words

Ramsau German	**Standard German**	**English**
[ə .o.pa]	*ein Opa*	'a grandpa'
[ə .ɔɪ̯.tɐ]	*ein Euter*	'an udder'
[ə .eɐ̯.dn̩]	*eine Erde*	'a world'
[ə .ɛ.ŋl̩]	*ein Engel*	'an angel'

I argue that *ein* never deletes because if [ə] were to elide, there would be no trace of that morpheme on the surface. Support for this explanation comes from Casali (1997:506), who describes a similar situation in another language. Casali writes: "…if the vowel in a V suffix is elided, there is no remaining segmental trace of the suffix." See also Schuh (1995:55) for similar discussion.

6.5 Conclusion

In this chapter, I have discussed hiatus and its cross-linguistic avoidance, shown Homorganic Glide Formation and Consonant Epenthesis (including R-Epenthesis), and discussed RG Vowel Elision. As in many other languages, RG takes certain measures to avoid hiatus (Glide Formation, epenthesis, and elision). However, RG also often allows hiatus and creates derived examples of hiatus via Liquid Vocalization. Therefore, both the constraint against hiatus, as well as the repairs to hiatus, appear to be optional. This is just one more example of the great variation allowed in the phonology of RG.

CHAPTER 7

CONCLUSION

7.1 Summary of the Dissertation

In this dissertation, I have examined the phonological behavior of BG sonorants and have provided analyses for the various changes these sounds undergo. This dissertation has brought a particular BG dialect (the one spoken in Ramsau, Austria) into discussion of some current issues in phonological theory.

In chapter 3, I presented the underlying segments in RG and assigned distinctive phonological features to those segments using a contrastive feature hierarchy (Dresher 2009). In the latter part of chapter 3, I used these contrastive features to analyze six phonological processes in RG which interact with processes affecting sonorant segments. I showed how the contrastive features predict certain phonological patterns. For example, RG Umlaut (e.g. /u/ → [i]) was shown to be a process of unrounding (and not fronting, as in SG). The distinctive features assigned to RG vowels accounted for this elegantly by treating Umlaut as the de-linking of the LABIAL node and the addition of a CORONAL node. Formulated in this way, RG Umlaut predicts that DORSAL vowels (that is, /a/) should not be affected and should thus behave differently than vowels marked as LABIAL. This prediction was confirmed by the data; thus, the distinctive features assigned to RG segments predicted certain phonological behaviors.

Chapter 4 focused on the natural class of [+nasal] segments and various opaque rule interactions involving nasals (including nasalized vowels). I discussed three examples of opaque rule interactions involving overapplication: one example is a counterbleeding order (in line with the traditional definition of opacity; see section 1.4), while the other two examples are of rules standing in a self-destructive feeding order: after an assimilation occurs, the context (trigger) for assimilation deletes (Baković 2007, 2011). For example, a self-destructive feeding interaction occurs when a word-final nasal assimilates to the place of a preceding voiced stop, and the voiced stop (the trigger for assimilation) subsequently deletes, thereby leaving an opaque output. These data and analysis support Baković's claim that some feeding rule orderings can produce opacity. Chapter 4 also provided an argument for analyzing the palatal fricative as a complex corono-dorsal segment, rather than as simplex coronal (cf. Hume 1992, 1996, Hall 1997, 2007b, and literature cited therein) or simplex dorsal (cf. Hall 1992b and Wiese 1996 for SG). Phonetic evidence that the palatal fricative has a CORONAL and DORSAL node was given: DFA links a CORONAL node to the palatal, which is also the trigger for place assimilation of a following nasal. After [ç], the velar nasal [ŋ] (and not palatal [ɲ] or coronal [n]) surfaces. Thus, the RG data provide evidence for the representation for palatals argued for in Robinson (2001) and Glover (2014).

In chapter 5, I discussed the phonological behavior of RG liquids and used the features presented in chapter 3 to analyze processes involving those sounds. I showed that coda liquids vocalize, thereby producing diphthongs with a coda glide. These were shown to have a different syllabic structure than underlying diphthongs and those produced via Diphthongization, where the glide is in the nucleus (see chapter 3). Another type of Liquid Vocalization (one affecting only /l/) was shown where the liquid vocalized post-vocalically in an onset, thereby producing an onset glide. I also analyzed several processes which interact with Liquid Vocalization. For example, Liquid Vocalization feeds Vowel Dissimilation, whereby front vowels which precede vocalized /l/ are realized as back vowels. Liquid Vocalization was also shown to interact transparently with Dorsal Fricative Assimilation (from chapter 3) and Progressive Nasal Place Assimilation (from chapter 4). Additionally, I presented an analysis for the syllabification of liquids and the realization of /ʀ/ as a flap allophone. Finally, I situated BG vocalizations within other Germanic languages, focusing on L-Vocalization in Alemannic dialects, English, and Dutch. The analysis of RG Liquid Vocalization (particularly vocalization of /l/) is important because to my knowledge, there is no other feature analysis of this kind of L-Vocalization (i.e. where /l/ is realized as a front vowel). Previous analyses have dealt only with vocalized /l/ surfacing as a back vowel (see, for example, Glover 2014).

Chapter 6 discussed the status of hiatus in RG. It was shown that while RG permits surface hiatus sequences about 50% of the time, there are also several repairs to hiatus observable in the remaining 50% of the data. For example, Homorganic Glide Formation creates onset glides ([j] and [w]) between vowels when the first vowel is CORONAL or LABIAL. Several consonants were also shown to function as hiatus breakers, namely [ʀ], [ʔ], and [n]. Finally, hiatus was also demonstrated to be avoided by eliding one of the two adjacent vowels. I argued that the insertion of a glide homorganic with a vowel, the epenthesis of a consonant, as well as the deletion of a vowel in the neighborhood of another vowel are motivated as repairs to a constraint against hiatus. I also showed how RG epenthetic consonants bear on the cross-linguistic literature on markedness.

7.2 Open Questions

Variation (also known as ‘optionality’) is the term describing the realization of multiple outputs for a single input (Anttila 2007:519); that is, there are several surface phonological representations which come from one input. Throughout this dissertation, variation was shown to be observable in RG phonology. For example, Diphthongization from chapter 3 was demonstrated to be an optional rule, e.g. both the forms [bux] and [buʊ̯x] were acceptable surface realizations for the word *Buch* ‘book’. In chapter 5, I discussed variation involving Vowel Dissimilation for RG mid front vowels preceding a vocalized /l/, and in chapter 6, I showed that there are many optional repairs for RG hiatus. Variation was shown to occur both between multiple tokens of an individual speaker and between multiple speakers of RG, so that sometimes one speaker produced more than one realization of a phonological input, or individual speakers produced different outputs from one another.

I believe there are certain sociolinguistic factors which may account for some of the variation seen in the data. First, I hypothesize that the high degree of variation for my RG speakers can be attributed to geography and the interaction of languages. RG is a South Central Bavarian dialect, which means that it has elements of both South and Central Bavarian regions. Speakers live in a transition zone between these two regions, and this suggests that the optionality of processes may be more widespread than in an area that is not in a transition zone. Thus, the speakers are ‘multi-dialectal’, and the optionality observed might indicate that speakers are switching between two dialects. For example, in Southern Bavarian, word-final /-n/ is retained, while Central Bavarian exhibits nasalization and deletion of /-n/ (Wiesinger 1990:459). Compare this to Regressive Vowel Nasalization and Nasal Consonant Deletion discussed in chapter 4: In most instances, these two rules apply, but when a pre-nasal vowel fails to nasalize, the following /n/ never deletes.

Another optional rule which may be a consequence of geography is Diphthongization. Zehetner (1985:79) states that there are up to 24 possible BG diphthongs from three origins: OHG/MHG diphthongs, historical diphthongization of long monophthongs, and liquid vocalizations. He states that the number of diphthongs and their distribution depends on each regional dialect (Zehetner 1985:78); therefore, one town may have a certain number of diphthongs, while another neighboring town has a different number. Zehetner's discussion indicates that diphthongization is not a synchronic process, but rather a historic one, and thus the diphthongs which surface in a given BG dialect (aside from those resulting from Liquid Vocalization) are phonemes. It was shown in chapter 3, however, that there is synchronic variation between [+ATR] monophthongs and diphthongs. This indicates that Diphthongization is a synchronic rule in RG.

In addition to being influenced by multiple dialect regions, my speakers know Standard Austrian German, and thus some of the optionality may be caused by switching between dialect and this standard form. Zehetner (1985:83) notes that even speakers who are steeped in their dialect may adopt certain qualities of the standard language, so that now their speech is a mixture of dialect and standard language.[106]

Another socio-linguistic factor which accounts for some of the variation in the RG data is rate of speech. It was noted in chapter 3 that in slower speech, subjects were more likely to diphthongize vowels than in quick speech.[107] Rate of speech also created variation in the application of Glottal Stop Epenthesis, discussed in chapter 6. It was shown that in

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[106] "*Selbst in Gegenden und bei Sprechern, die mundartfest sind, fällt auf, daß Lautungen aus der hochsprache übernommen werden ... Standen früher die beiden Ebenen Dialekt und Schriftsprache in verhältnismäßig schroffem Gegensatz einander gegenüber, so verschmelzen sie zusehends ineinander: Das Resultat ist eine Art Mischsprache aus beiden...*" (Zehetner 1985:82-83) "Even in regions and with speakers who are firmly entrenched in the dialect, sounds from the standard language are adopted … Where it used to be that both levels of dialect and written language stood in comparatively stark contrast to one another, they are noticeably melting into one another: the result is a kind of mixed language of both."

[107] Sentence level stress was also indicated as playing a role in application of Diphthongization.

slower speech, the glottal stop was optionally epenthesized, while in quick speech, there was no Glottal Stop Epenthesis.

As discussed in chapter 5, there is also variation concerning application of Vowel Dissimilation. Wiesinger (1990:470) describes a situation where the diphthong [ui] has more prestige in and around Munich; therefore, speakers are more likely to produce this diphthong due to this sociolinguistic factor. Perhaps prestige plays a role in the distribution of Vowel Dissimilation in Styria, although this is ultimately a question I leave open for further research.

I follow scholars such as Labov (1969) and Vaux (2008), who discuss ways to formally analyze rules which are optional. For example, Vaux (2008) marks variable rules as [+optional]. Such analyses tend to be more sociolinguistic in nature, as is the discussion above. However, as Coetzee & Pater (2011:433) state: "…phonologists outside the sociolinguistic tradition have been reluctant to embrace variable rules." Instead, some phonologists have developed analyses in constraint-based frameworks to account for occurrence of variation itself and for which variants surface. See, for example, Multiple Grammars Theory (Kroch 1989, Anttila 2002b, 2007) or Partially Ordered Grammars (Anttila 1997, 2002a, Anttila & Cho 1998). As stated above, I believe there are sociolinguistic reasons for why variation occurs in this dialect. Therefore, I do not attempt to provide a formal account for variation in terms of phonological analysis. For more discussion on formally capturing optionality in rule-based frameworks, see Coetzee & Pater (2011).

There are several other questions which could be examined in the future, particularly concerning consonant epenthesis. For example, Zehetner (1985:88) and

Merkle (2005:30) give data for [d] Epenthesis in Central Bavarian, in addition to the other epenthetic consonants discussed in chapter 6. Further investigation and data collection of my subjects' speech might potentially elicit more repairs to hiatus, such as [d]. This would be a good direction for future work. Another question concerns the productivity of consonant epenthesis. Specifically, it was shown that [ʀ] and [n] surface as epenthetic in RG, but the data in my corpus were inconclusive as to how productive these processes are. Further study, which includes loan words and nonce words, could be helpful to elucidate the productivity of these epenthetic consonants. Questions concerning the connection between consonant epenthesis and markedness were also highlighted in chapter 6. For example, it was shown that previous analyses of consonant epenthesis (e.g. de Lacy 2006 and Uffmann 2007) could not account for all epenthetic consonants in RG (i.e. [ʔ n ʀ j w]) in terms of PoA markedness or manner markedness. Thus, the question of which hierarchy or dimension of markedness can account for these epentheses remains unanswered. One last question was why RG has R-Epenthesis after a high vowel, when other cross-linguistic R-Epentheses only occur in the context of a low vowel. This question also remains open for further study.

Finally, throughout the dissertation I discussed very little data from my speakers in Dachau; instead I focused on the Styrian data. It would be interesting to compare more of the data from the two regions and perhaps test the analyses and predictions made here on another region. For example, one could investigate whether the features I assigned to this dialect also account for the behavior of the phonology of Dachau speakers.

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EDUCATION

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Area Certificate in English and Germanic Philology
Indiana University, Bloomington, IN
Dissertation: "The Phonology of Sonorants in Bavarian German"

M.A. in Germanic Studies **2010**
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Master's Project: "Sonorant Gemination and its Blockage in Visperterminen German"

B.A. in Germanic Studies and Music **2008**
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TEACHING EXPERIENCE

LANGUAGE COURSE TAUGHT AT UNIVERSITY OF NORTH TEXAS

Adjunct Faculty - Beginning German **Fall 2016**

LANGUAGE COURSES TAUGHT AT INDIANA UNIVERSITY

Course Chair/Instructor - Beginning German **Summer 2013**
Fall 2011
Instructor - Beginning through Intermediate German (Semesters 1-4) **Fall 2009-Spring 2011**
Instructor - Advanced German – 5th Semester **Spring 2012**
Instructor - Graduate Reading Knowledge for German, I, II **AY 2012-13**

CONTENT COURSE TAUGHT AT BAYLOR UNIVERSITY

Temporary Lecturer – Introduction to Language and Linguistics **Spring 2015**

CONTENT COURSES TAUGHT THROUGH INDIANA UNIVERSITY

Supervisor - German Pedagogy **Spring 2012**
Instructor - German Phonetics **Summers 2010-11**
Instructor - German Grammar **Summers 2010-11**
Instructor - German Choir **Summers 2010-11**

CONFERENCE PAPERS AND WORKSHOPS

LINGUISTICS PAPERS

"Bavarian German Hiatus Avoidance" **April 2017**
Germanic Linguistics Annual Conference, Austin, Texas

"Bavarian German *r*-Flapping: Evidence for a dialect-specific Sonority Hierarchy" **May 2016**
Germanic Linguistics Annual Conference, Reykjavík, Iceland

"Bavarian German L-Vocalization and Vowel Dissimilation" **May 2015**
Germanic Linguistics Annual Conference, Provo, Utah

"Understanding Bavarian German by recognizing phonological rules and applying them to everyday speech" **May 2014**
DAAD Annual Conference, Halle, Germany

"Vowel Unpacking of French Loanwords: Evidence for Dorsal Unmarkedness" **April 2013**
Germanic Linguistics Annual Conference, Buffalo, New York

"R-Epenthesis in Bavarian German" **September 2012**
Institute of German Studies Summer Graduate Fellowship Colloquium
Department of Germanic Studies, Indiana University, Bloomington

"A Feature Geometric Account of Sonorant Gemination and its Blockage in Visperterminen German" **April 2012**
Germanic Linguistics Annual Conference, Bloomington, Indiana

"Vowel Unpacking of French Loanwords in German and Norwegian: Evidence for Dorsal Unmarkedness" (Poster Presentation) **October 2011**
Mid-Phon 2011, Urbana-Champaign, Illinois

"Sonorant Gemination and its Blockage in Visperterminen German" **February 2011**
Germanic Studies Graduate Student Conference, Indiana University, Bloomington

PEDAGOGICAL PAPERS AND WORKSHOPS

"Mnemonic Spaces: Music in Foreign Language Learning" **May 2017**
Workshop on Foreign Language Teaching (in collaboration with Joseph Noelliste)
SCENARIO Forum Conference
Cork, Ireland

“Drama in Foreign Language Education” **August 2012**
Drama Pedagogy Workshop (in collaboration with Susanne Even)
Trinity College of Arts & Sciences
Duke University, Durham, North Carolina

“Rational Romance” **October 2011**
Workshop on Teaching Foreign Language Poetry (in collaboration with Susanne Even)
Indiana Foreign Language Teachers Association (annual conference)
Indianapolis, Indiana

“Pictionary Vocabulary Review” **October 2009**
Foreign Language Share Fair, Indiana University, Bloomington

ACADEMIC FELLOWSHIPS AND HONORS

FULL YEAR GRADUATE FELLOWSHIPS

Louise McNutt Fellowship and Salaroglio Modern Foreign Language Scholarship **AY 2015-16**
College of Arts and Sciences, Indiana University

Max Kade Dissertation Fellowship **AY 2014-15**
Department of Germanic Studies, Indiana University

Deutscher Akademischer Austausch Dienst (DAAD) **AY 2013-14**

Max Kade Fellowship **AY 2008-09**
Department of Germanic Studies, Indiana University

OTHER GRADUATE FELLOWSHIPS

College of Arts and Sciences Travel Award **Spring 2016**
Indiana University

Institute of German Studies Summer Research Fellowship **Summer 2012**
Department of Germanic Studies, Indiana University

Foreign Language and Area Studies (FLAS) Summer Fellowship (Norwegian) **Summer 2009**
West European Studies, Indiana University

E. O. Wooley Scholarship **2011**
Department of Germanic Studies, Indiana University

Blaisdell Award **2010**
Department of Germanic Studies, Indiana University

Other Awards and Honors

Eli Lilly Endowment	**2004-08**
Hutton Honors College Scholarship Indiana University	**2004-08**
Elnora Hartman Stickley Music Scholarship	**2004-06**
Hutton Honors College Study Abroad Scholarship Indiana University	**Spring 2007**
Delta Phi Alpha German Honor Association	**2005-08**

FORTHCOMING PUBLICATION

Sonorant Gemination and its Blockage in Visperterminen German *Journal of Germanic Linguistics* (JGL) Society for Germanic Linguistics, Cambridge University Press Currently under revision for resubmission.	**Forthcoming**

PROFESSIONAL EXPERIENCE

Proofreader for the *Journal of Germanic Linguistics* (JGL) Society for Germanic Linguistics, Cambridge University Press	**January 2015-Present**
Consultant for German Diction Course	**AY 2011-12**
Assistant for Online Placement Exam Creation Committee	**2011-12**
Financial Coordinator Indiana University Honors Program in Foreign Languages, Krefeld, Germany	**Summers 2010-11**
Conductor for German Choir Department of Germanic Studies, Indiana University	**Spring 2009**

GERMAN OUTREACH

Department of Germanic Studies, Indiana University

Host and Guide for visiting high school seniors	**Spring 2013**
Co-Organizer for Embassy-Sponsored *Do Deutsch* German Outreach Program	**Fall 2011**
Campus Tour for Prospective Freshmen majoring in German	**Fall 2010, 2011**
Sample first semester university Class for high school students	**Fall 2010**

INSTITUTIONAL SERVICE

WORLD LANGUAGES, LITERATURES, & CULTURES, UNIVERSITY OF NORTH TEXAS

Co-Organizer of German table at the fall Language Fair **October 2016**

DEPARTMENT OF GERMANIC STUDIES, INDIANA UNIVERSITY

Secretary for Germanic Studies Graduate Student Conference **2011-2013**

Planning Committee for Germanic Studies Graduate Student Conference **2008-13**

Co-President for Graduate Steering Committee **AY 2010-11**

Secretary for Graduate Steering Committee **AY 2009-10**

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OVERSEAS ACADEMIC EXPERIENCE

Universitetet i Oslo, Oslo, Norway **Summer 2009**
Summer Study Abroad Norwegian Language Program

Albert-Ludwigs-Universität Freiburg, Freiburg, Germany **Spring 2007**
Semester Abroad

LANGUAGES

English (American)	**Native Speaker**
German	**Near-Native Fluency**
Norwegian	**Intermediate**
Dutch	**Beginner**
Old Norse	**Reading Knowledge**
Gothic	**Reading Knowledge**
Middle High German	**Reading Knowledge**
Old High German	**Reading Knowledge**
Old English	**Reading Knowledge**